installation, start-up and service instructions

SINGLE PACKAGE ROOFTOP ELECTRIC HEATING/ELECTRIC COOLING UNITS

559F
Sizes 180-300
15 to 25 Tons

Cancels: II 559F-180-3 II 559F-180-4
10/15/98

CONTENTS

SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ **WARNING:** Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

IMPORTANT: Units have high ambient operating limits. If limits are exceeded, the units will automatically lock the compressor out of operation. Manual reset will be required to restart the compressor.

INSTALLATION

I. STEP 1 — PROVIDE UNIT SUPPORT

A. Roof Curb

Assemble and install accessory roof curb or horizontal adapter roof curb in accordance with instructions shipped with the curb or horizontal adapter. Accessory roof curb and horizontal adapter roof curb and information required to field fabricate a roof curb or horizontal adapter roof curb are shown in Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be secured to roof curb before unit is set in place.

IMPORTANT: The gasketing of the unit to the roof curb or adapter roof curb is critical for a leak-proof seal. Install gasket supplied with the roof curb or adapter roof curb as shown in Fig. 1. Improperly applied gasket can result in air leaks and poor unit performance.

Curb or adapter roof curb should be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is ± 1/16 in. per linear ft in any direction. Refer to Accessory Roof Curb or Horizontal Adapter Roof Curb Installation Instructions for additional information as required.

B. Alternate Unit Support

When the curb or adapter cannot be used, support unit with sleepers using unit curb or adapter support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

II. STEP 2 — RIG AND PLACE UNIT

Inspect unit for transportation damage. File any claim with transportation agency. Keep unit upright, and do not drop. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is ± 1/16 in. per linear ft in any direction. See Fig. 3 for additional information. Unit weight is shown in Table 1.

Four lifting holes are provided in ends of unit base rails as shown in Fig. 3. Refer to rigging instructions on unit.

A. Positioning

Provide clearance around and above unit for airflow, safety, and service access (Fig. 4 and 5).

Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air.

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

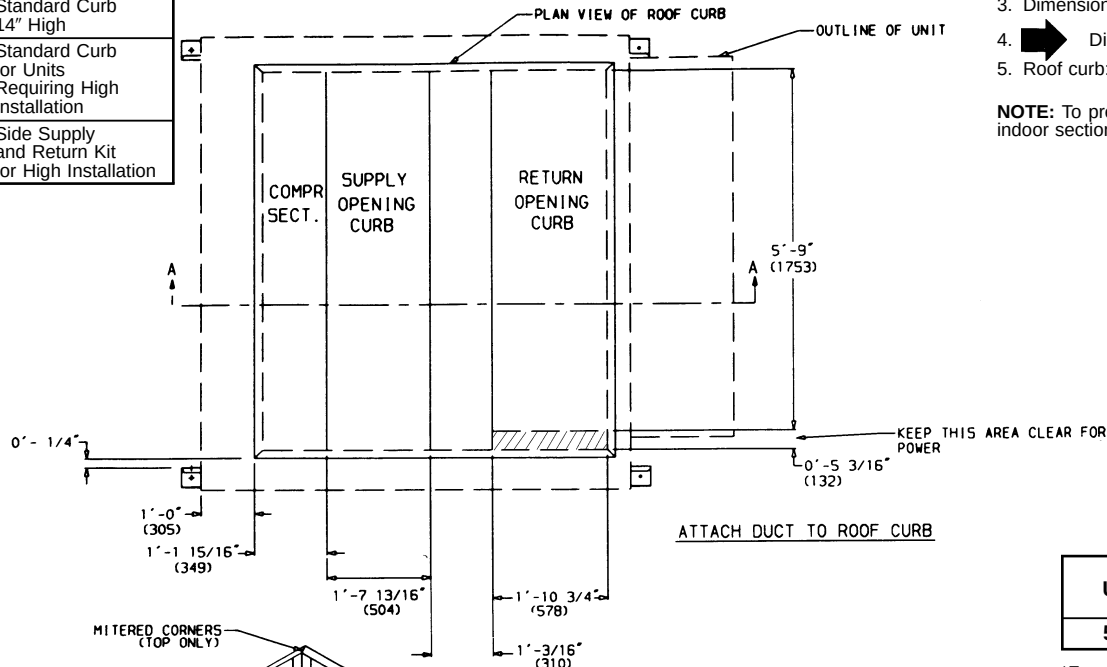
B. Roof Mount

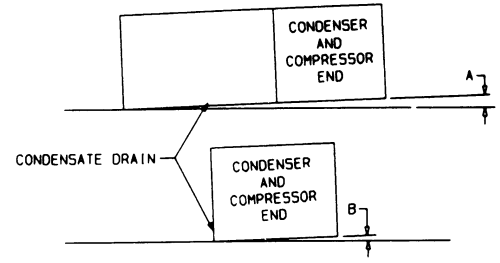
Check building codes for weight distribution requirements.

PKG. NO. REF.	CURB HEIGHT	DESCRIPTION
308450-201	1′-2″ (305)	Standard Curb 14″ High
308450-202	2′-0″ (610)	Standard Curb for Units Requiring High Installation
308450-203	2′-0″ (610)	Side Supply and Return Kit for High Installation

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels: ½″ thick neoprene coated 2 lb density.
3. Dimensions in ( ) are in millimeters.
4. ➡ Direction of airflow.
5. Roof curb: 16 ga. (VA03-56) stl.

NOTE: To prevent the hazard of stagnant water build-up in the drain pan of the indoor section, unit can only be pitched as shown.

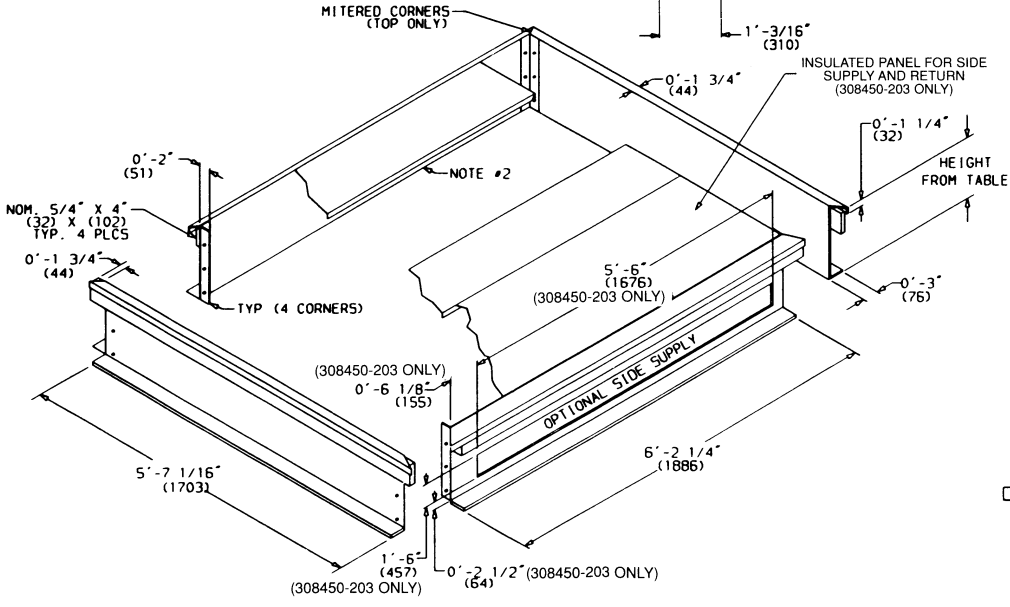


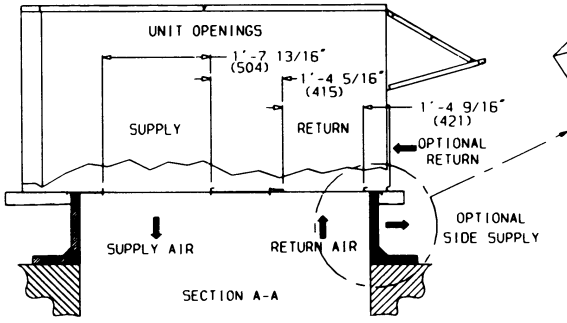


UNIT LEVELING TOLERANCES*
Dimensions (degrees and inches)

UNIT	A		B	
	DEG.	IN.	DEG.	IN.
559F	.28	.45	.28	.43

*From edge of unit to horizontal.





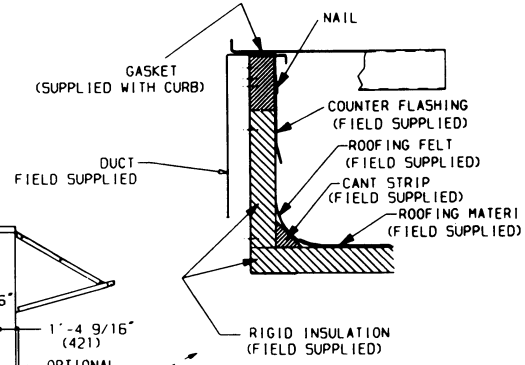
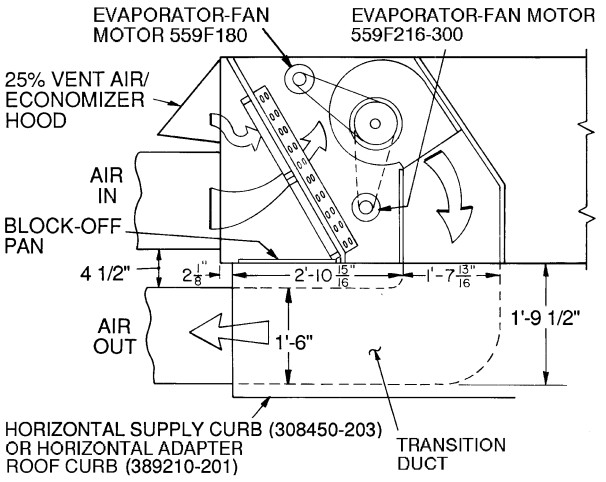
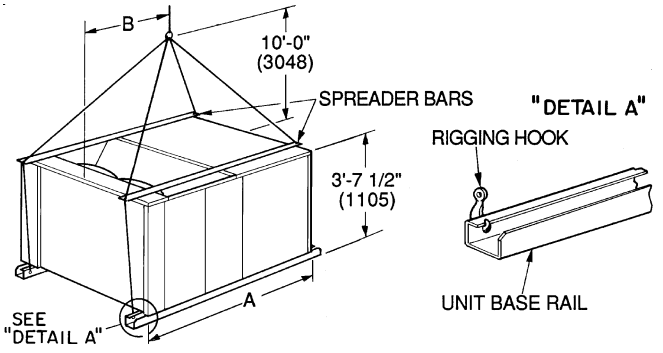


Fig. 1 — Roof Curb Details



NOTE: For preassembled horizontal adapter roof curb part no. 389210-201, the accessory kit includes a factory-designed, high-static, regain transition duct. For horizontal curb part no. 308450-203, a field-supplied transition duct is required.

Fig. 2 — Horizontal Adapter Roof Curb and Roof Curb



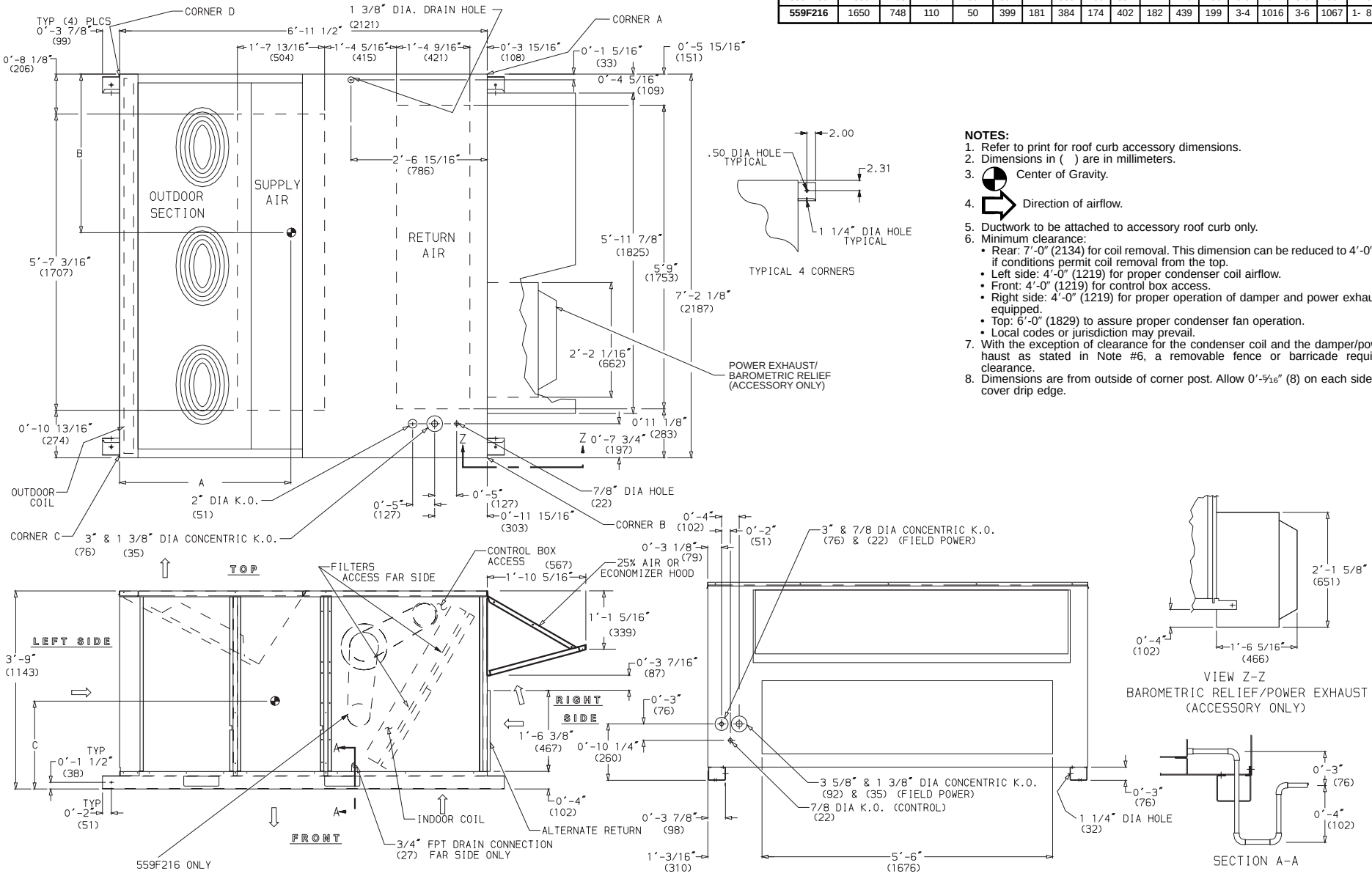
UNIT 559F	MAXIMUM SHIPPING WEIGHT		DIMENSIONS			
			A		B	
	lb	kg	ft-in.	mm	ft-in.	mm
180	1625	737	6-11½	2121	4- 0	1219
216	1725	782	6-11½	2121	3-10	1168
240	1835	832	6-11½	2121	3- 7	1092
300	1985	900	6-11½	2121	3- 5	1041

NOTES:
1. Dimensions in ( ) are in millimeters.
2. Refer to Fig. 5 and 6 for unit operating weights.
3. Remove boards at ends of unit and runners prior to rigging.
4. Rig by inserting hooks into unit base rails as shown. Use corner post from packaging to protect coil from damage. Use bumper boards for spreader bars.
5. Weights do not include optional economizer. See Fig. 5 and 6 for economizer weight.
6. Weights given are for aluminum evaporator and condenser coil plate fins. For copper condenser coil add 150 lb (68 kg). For copper condenser and evaporator coils add 280 lb (127 kg).

⚠ **CAUTION:** All panels must be in place when rigging.

Fig. 3 — Rigging Details

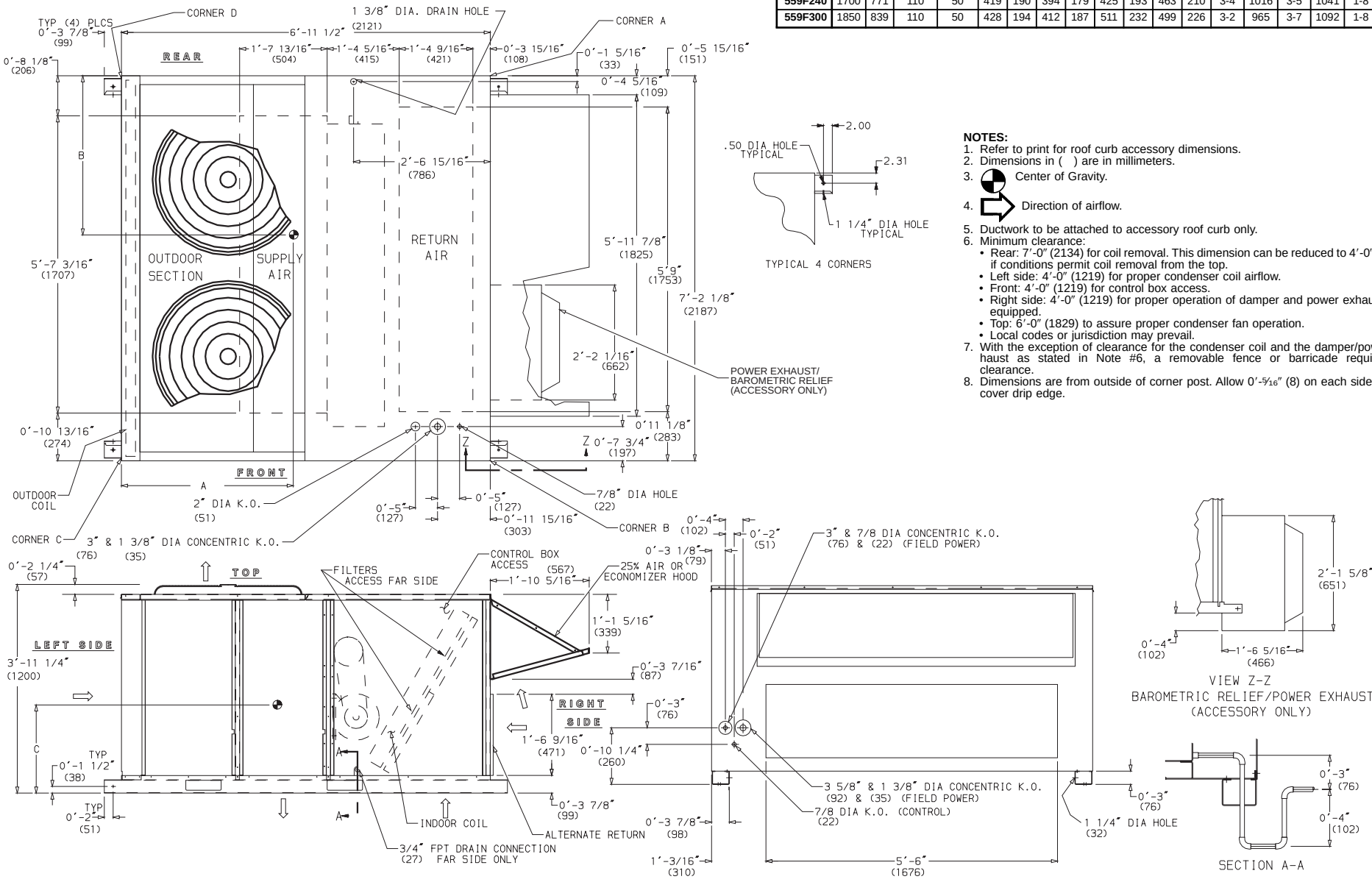
UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER A		CORNER B		CORNER C		CORNER D		DIM A		DIM B		DIM C	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm
559F180	1550	703	110	50	391	177	365	166	384	174	410	186	3-5	1041	3-6	1067	1-10	559
559F216	1650	748	110	50	399	181	384	174	402	182	439	199	3-4	1016	3-6	1067	1- 8	508



NOTES:
1. Refer to print for roof curb accessory dimensions.
2. Dimensions in ( ) are in millimeters.
3. Center of Gravity.
4. Direction of airflow.
5. Ductwork to be attached to accessory roof curb only.
6. Minimum clearance:
   - Rear: 7′-0″ (2134) for coil removal. This dimension can be reduced to 4′-0″ (1219) if conditions permit coil removal from the top.
   - Left side: 4′-0″ (1219) for proper condenser coil airflow.
   - Front: 4′-0″ (1219) for control box access.
   - Right side: 4′-0″ (1219) for proper operation of damper and power exhaust if so equipped.
   - Top: 6′-0″ (1829) to assure proper condenser fan operation.
   - Local codes or jurisdiction may prevail.
7. With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note #6, a removable fence or barricade requires no clearance.
8. Dimensions are from outside of corner post. Allow 0′-5/16″ (8) on each side for top cover drip edge.

Fig. 4 — Base Unit Dimensions, 559F180 and 216

UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER A		CORNER B		CORNER C		CORNER D		DIM A		DIM B		DIM C	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm
559F240	1700	771	110	50	419	190	394	179	425	193	463	210	3-4	1016	3-5	1041	1-8	508
559F300	1850	839	110	50	428	194	412	187	511	232	499	226	3-2	965	3-7	1092	1-8	508



NOTES:
1. Refer to print for roof curb accessory dimensions.
2. Dimensions in ( ) are in millimeters.
3. Center of Gravity.
4. Direction of airflow.
5. Ductwork to be attached to accessory roof curb only.
6. Minimum clearance:
   - Rear: 7′-0″ (2134) for coil removal. This dimension can be reduced to 4′-0″ (1219) if conditions permit coil removal from the top.
   - Left side: 4′-0″ (1219) for proper condenser coil airflow.
   - Front: 4′-0″ (1219) for control box access.
   - Right side: 4′-0″ (1219) for proper operation of damper and power exhaust if so equipped.
   - Top: 6′-0″ (1829) to assure proper condenser fan operation.
   - Local codes or jurisdiction may prevail.
7. With the exception of clearance for the condenser coil and the damper/power exhaust as stated in Note #6, a removable fence or barricade requires no clearance.
8. Dimensions are from outside of corner post. Allow 0′-5/16″ (8) on each side for top cover drip edge.

Fig. 5 — Base Unit Dimensions, 559F240 and 300

Table 1 — Physical Data

UNIT 559F		180	216	240	300
NOMINAL CAPACITY (tons)		15	18	20	25
OPERATING WEIGHT		1550	1650	1700	1850
COMPRESSOR			Scroll, Copeland		
Quantity ... Model (Ckt 1 , Ckt 2)		2...ZR94KC	1...ZR108KC, 1...ZR94KC	1...ZR125KC, 1...ZR108KC	1...ZR16M3, 1...ZR125KC
Number of Refrigerant Circuits		2	2	2	2
Oil (oz) (Ckt 1 , Ckt 2)		81, 81	106,81	106, 106	136, 106
REFRIGERANT TYPE			R-22		
Expansion Device			TXV		
Operating Charge (lb-oz)					
Circuit 1 *		10-10	15-5	16-0	20-13
Circuit 2		10-10	12-3	13-6	13- 0
CONDENSER COIL			Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins		
Rows...Fins/in.		2...17	3...15	3...15	4...15
Total Face Area (sq ft)		21.7	21.7	21.7	21.7
CONDENSER FAN			Propeller Type		
Nominal Cfm		10,500	10,500	14,200	14,200
Quantity...Diameter (in.)		3...22	3...22	2...30	2...30
Motor Hp...Rpm		1/2...1050	1/2...1050	1...1075	1...1075
Watts Input (Total)		1100	1100	3400	3400
EVAPORATOR COIL			Cross-Hatched 3/8-in. Copper Tubes, Aluminum Lanced or Copper Plate Fins, Face Split		
Rows...Fins/in.		2...17	3...15	3...15	4...15
Total Face Area (sq ft)		17.5	17.5	17.5	17.5
EVAPORATOR FAN			Centrifugal Type		
Quantity...Size (in.)		2...10 x 10	2...12 x 12	2...12 x 12	2...12 x 12
Type Drive		Belt	Belt	Belt	Belt
Nominal Cfm		6000	7200	8000	10,000
Motor Hp		3.7	5	7.5	10
Motor Nominal Rpm		1725	1745	1745	1740
Maximum Continuous Bhp		4.25	5.90	8.7 [208/230 v] 9.5 [460 v]	10.2 [208/230 v] 11.8 [460 v]
Motor Frame Size		56H	184T	213T	215T
Nominal Rpm High/Low		—	—	—	—
Fan Rpm Range	Low-Medium Static	891-1179	910-1095	1002-1225	1066-1283
	High Static	1227-1550	1069-1287	1193-1458	1332-1550
Motor Bearing Type		Ball	Ball	Ball	Ball
Maximum Allowable Rpm		1550	1550	1550	1550
Motor Pulley Pitch Diameter	Low-Medium Static	3.1/4.1	4.9/5.9	5.4/6.6	4.9/5.9
Min/Max (in.)	High Static	3.7/4.7	4.9/5.9	5.4/6.6	4.9/5.9
Nominal Motor Shaft Diameter (in.)		7/8	1 1/8	1 3/8	1 3/8
Fan Pulley Pitch Diameter (in.)	Low-Medium Static	6.0	9.4	9.4	8.0
	High Static	5.2	8.0	7.9	6.4
Nominal Fan Shaft Diameter (in.)		1 3/16	1 7/16	1 7/16	1 7/16
Belt, Quantity...Type...Length (in.)	Low-Medium Static	1...BX...42	1...BX...50	1...BX...53	2...BX...50
	High Static	1...BX...42	1...BX...48	1...BX...50	2...BX...47
Pulley Center Line Distance (in.)		13.5-15.5	13.3-14.8	14.6-15.4	14.6-15.4
Speed Change per Full Turn of	Low-Medium Static	48	37	37	36
Movable Pulley Flange (rpm)	High Static	55	34	44	45
Movable Pulley Maximum Full Turns From Closed Position		5	5	5	5
Factory Speed		3.5	3.5	3.5	3.5
Factory Speed Setting (rpm)	Low-Medium Static	1035	1002	1120	1182
	High Static	1389	1178	1328	1470
Fan Shaft Diameter at Pulley (in.)		1 3/16	1 7/16	1 7/16	1 7/16
HIGH-PRESSURE SWITCH (psig)					
Cutout			426		
Reset (Auto)			320		
LOW-PRESSURE SWITCH (psig)					
Cutout			27		
Reset (Auto)			44		
FREEZE PROTECTION THERMOSTAT (F)					
Opens			30 ± 5		
Closes			45 ± 5		
OUTDOOR-AIR INLET SCREENS			Cleanable		
Quantity...Size (in.)			2...20 x 25 x 1 1...20 x 20 x 1		
RETURN-AIR FILTERS			Throwaway**		
Quantity...Size (in.)			4...20 x 20 x 2 4...16 x 20 x 2		
POWER EXHAUST			1/2 Hp, 208/230-460 v Motor Direct Drive, Propeller-Fan (Factory-Wired for 460 v)		

LEGEND

Bhp — Brake Horsepower
TXV — Thermostatic Expansion Valve

*Circuit 1 uses the lower portion of the condenser coil and lower portion of the evaporator coils; and Circuit 2 uses the upper portion of both coils.
†The 559F300 unit requires 2-in. industrial-grade filters capable of handling face velocities up to 625 ft/min (such as American Air Filter no. 5700 or equivalent).

NOTE: The 559F units have a low-pressure switch (standard) located on the suction side.

III. STEP 3 — FIELD FABRICATE DUCTWORK

Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

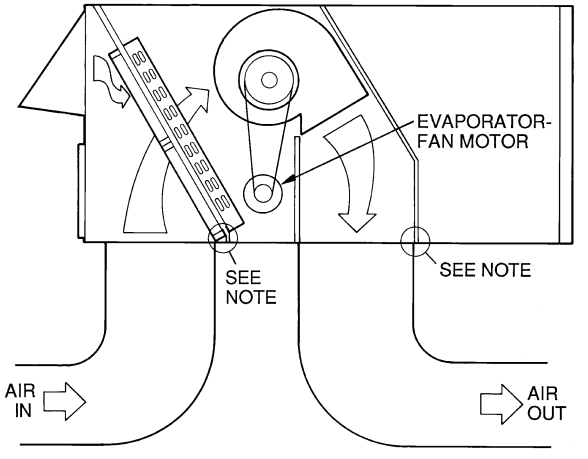
Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

The 559F units with electric heat require a 1-in. clearance for the first 24 in. of ductwork.

Outlet grilles must not lie directly below unit discharge.

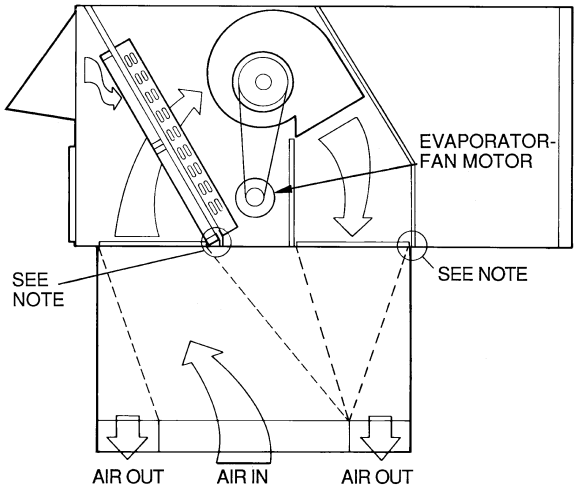
NOTE: A 90-degree elbow must be provided in the ductwork to comply with UL (Underwriters' Laboratories) codes for use with electric heat.

⚠ **WARNING:** For vertical supply and return units, tools or parts could drop into ductwork and cause an injury. Install a 90 degree turn in the return ductwork between the unit and the conditioned space. If a 90 degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space. Due to electric heater, supply duct will require 90 degree elbow.



NOTE: Do not drill in this area, as damage to basepan may result in water leak.

Fig. 6 — Air Distribution — Thru-the-Bottom (559F216-300 Shown)



NOTE: Do not drill in this area, as damage to basepan may result in water leak.

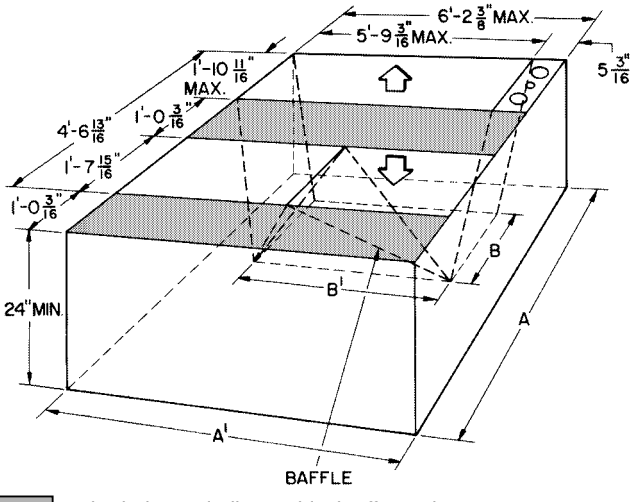
Fig. 7 — Concentric Duct Air Distribution (559F216-300 Shown)

IV. STEP 4 — MAKE UNIT DUCT CONNECTIONS

Unit is shipped for thru-the-bottom duct connections. Ductwork openings are shown in Fig. 6. Field-fabricated concentric ductwork may be connected as shown in Fig. 7 and 8. Attach all ductwork to roof curb and roof curb basepans. Refer to installation instructions shipped with accessory roof curb for more information.

V. STEP 5 — TRAP CONDENSATE DRAIN

See Fig. 4, 5, and 9 for drain location. Plug is provided in drain hole and must be removed when unit is operating. One ¾-in. half coupling is provided inside unit evaporator section for condensate drain connection. An 8½ in. x ¾-in. diameter nipple and a 2-in. x ¾-in. diameter pipe nipple are coupled to standard ¾-in. diameter elbows to provide a straight path down through holes in unit base rails (see Fig. 10). A trap at least 4-in. deep must be used.



Shaded area indicates block-off panels.

NOTE: Dimension A, A′ and B, B′ are obtained from field-supplied ceiling diffuser.

Fig. 8 — Concentric Duct Details

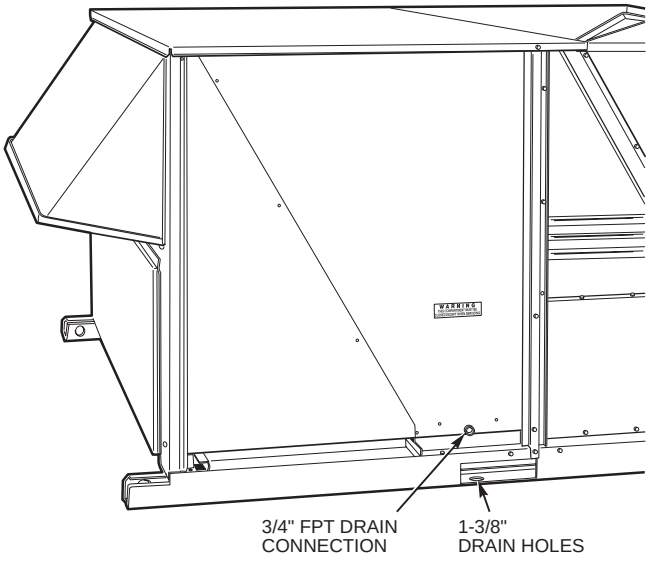


Fig. 9 — Condensate Drain Details (559F180,216 Shown)

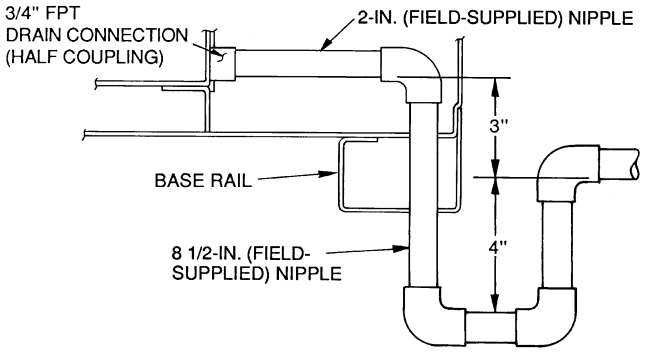


Fig. 10 — Condensate Drain Piping Details

VI. STEP 5 — MAKE ELECTRICAL CONNECTIONS

A. Field Power Supply

Unit is factory wired for voltage shown on nameplate.

When installing units, provide a disconnect, per NEC (National Electrical Code) requirements, of adequate size (Table 2).

All field wiring must comply with NEC and local requirements.

Route power lines through control box access panel or unit basepan (Fig. 4 and 5) to connections as shown on unit wiring diagram and Fig. 11.

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2% and the current must be balanced within 10%.

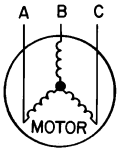
⚠ **CAUTION:** The correct power phasing is critical in the operation of the scroll compressors. An incorrect phasing will cause the compressor to rotate in the wrong direction. This may lead to premature compressor failure.

Use the following formula to determine the percentage of voltage imbalance.

Percentage of Voltage Imbalance

$$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$

$$= \frac{1371}{3}$$

$$= 457$$

Determine maximum deviation from average voltage:

(AB) 457 − 452 = 5 v
(BC) 464 − 457 = 7 v
(AC) 457 − 455 = 2 v

Maximum deviation is 7 v.

Determine the percentage of voltage imbalance:

$$\text{Percentage of Voltage Imbalance} = 100 \times \frac{7}{457}$$

$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

B. Field Control Wiring

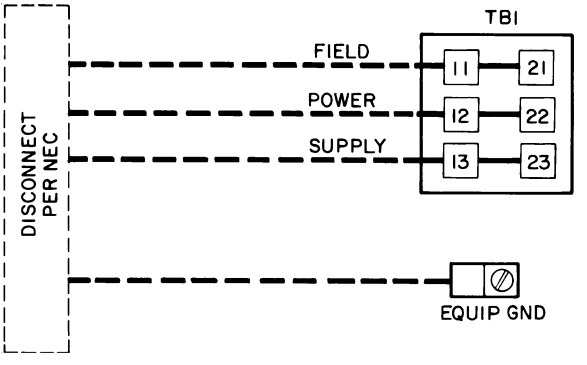
Install a Bryant-approved accessory thermostat assembly according to the installation instructions included with the accessory. Locate thermostat assembly on a solid wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of no. 18 AWG (American Wire Gage) colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 12.

NOTE: For wire runs up to 50 ft, use no. 18 AWG insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C minimum). All wire larger than no. 18 AWG cannot be directly connected to the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as indicated in Table 3. Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to accessory remote control instructions as required.



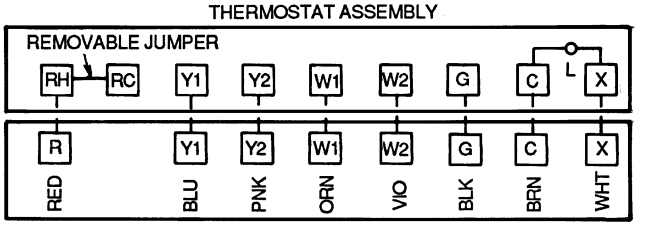
TB1 MAXIMUM WIRE SIZE

UNIT 559F	VOLTAGE	
	208/230	460
All	350 kcmil	2/0

LEGEND

EQUIP — Equipment
GND — Ground
kcmil — Thousand Circular Mils
NEC — National Electrical Code
TB — Terminal Block

Fig. 11 — Field Power Wiring Connections



UNIT LOW-VOLTAGE CONNECTIONS

Fig. 12 — Field Control Thermostat Wiring

Table 2 — Electrical Data

UNIT 559F	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR				OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
				No. 1		No. 2												
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
180 (15 Tons)	208/230	187	253	28.8	195	28.8	195	3	0.5	1.7	3.7	10.5/11.0	— 4.6	— 18.8	— —	— —	81/81 85/86	100/100 110/110
													— 4.6	— 18.8	26/34 26/34	71/82 71/82	102/116 108/122	110/125 110/125
													— 4.6	— 18.8	42/56 42/56	117/135 117/135	159/149 165/155	175/175 175/175
													— 4.6	— 18.8	56/75 56/75	156/180 156/180	169/194 175/200	200/225 200/225
	460	414	508	14.7	95	14.7	95	3	0.5	0.8	3.7	4.8	— 2.3	— 6.0	— —	— —	40 43	50 50
													— 2.3	— 6.0	32 32	39 39	55 58	60 60
													— 2.3	— 6.0	55 55	66 66	72 75	80 80
													— 2.3	— 6.0	80 80	96 96	102 105	110 110
216 (18 Tons)	208/230	187	253	30.1	225	28.8	195	3	0.5	1.7	5.0	15.8/15.8	— 4.6	— 18.8	— —	— —	87/87 92/92	110/110 110/110
													— 4.6	— 18.8	26/34 26/34	71/82 71/82	109/122 114/128	110/125 125/150
													— 4.8	— 18.8	42/56 42/56	117/135 117/135	166/155 172/161	175/175 175/175
													— 4.6	— 18.8	56/75 56/75	156/180 156/180	176/200 182/206	200/225 200/225
	460	414	508	15.5	114	14.7	95	3	0.5	0.8	5.0	7.9	— 2.3	— 6.0	— —	— —	44 47	50 60
													— 2.3	— 6.0	32 32	39 39	59 61	60 70
													— 2.3	— 6.0	55 55	66 66	76 79	90 90
													— 2.3	— 6.0	80 80	96 96	106 109	125 125
240 (20 Tons)	208/230	187	253	37.8	239	30.1	225	2	1	6.6	7.5	25.0/25.0	— 4.6	— 18.8	— —	— —	116/116 120/120	150/150 150/150
													— 4.6	— 18.8	26/34 26/34	71/82 71/82	120/134 126/140	150/150 150/150
													— 4.6	— 18.8	42/56 42/56	117/135 117/135	178/166 183/172	200/175 200/175
													— 4.6	— 18.8	56/75 56/75	156/180 156/180	187/211 193/217	200/225 200/225
	460	414	508	17.2	125	15.5	114	2	1	3.3	7.5	13.0	— 2.3	— 6.0	— —	— —	57 59	70 70
													— 2.3	— 6.0	32 32	39 39	65 68	70 70
													— 2.3	— 6.0	55 55	66 66	82 85	90 90
													— 2.3	— 6.0	80 80	96 96	112 115	125 125

Table 2 — Electrical Data (cont)

UNIT 559F	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 2		OFM			IFM		POWER EXHAUST		ELECTRIC HEAT*		POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	kW	FLA	MCA	MOCP†
300 (25 Tons)	208/230	187	253	41.0	350	37.8	239	2	1	6.6	10.0	28.0/28.0	— 4.6	— 18.8	— —	— —	130/130 135/135	150/150 175/175
													— 4.6	— 18.8	26/34 26/34	71/82 71/82	130/138 135/143	150/150 175/175
													— 4.6	— 18.8	42/56 42/56	117/135 117/135	181/170 187/176	200/175 200/200
													— 4.6	– 18.8	56/75 56/75	156/180 156/180	191/215 197/221	200/225 200/225
	460	414	508	21.8	158	17.2	125	2	1	2.8	10.0	14.6	— 2.3	— 6.0	— —	— —	66 68	80 80
													— 2.3	— 6.0	32 32	39 39	67 70	80 80
													— 2.3	— 6.0	55 55	66 66	84 87	90 100
													— 2.3	— 6.0	80 80	96 96	114 117	125 125

LEGEND

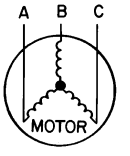
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Heater capacity (kW) is based on heater voltage of 208 v, 240 v, and 480 v. Heaters are rated at 240 v and 480 v. If power distribution voltage to unit varies from rated heater voltage, heater kW will vary accordingly.
†Fuse or HACR circuit breaker.

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. The Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.

   $$\% \text{ Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

   EXAMPLE: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3} = \frac{1371}{3} = 457$$

Determine maximum deviation from average voltage.
(AB) 457 − 452 = 5 v
(BC) 464 − 457 = 7 v
(AC) 457 − 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\% \text{ Voltage Imbalance} = 100 \times \frac{7}{457} = 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

3. MCA calculation for units with electric heaters over 50 kW = (1.25 x IFM amps) + (1.00 x heater FLA).

VII. STEP 7 — MAKE OUTDOOR-AIR INLET ADJUSTMENTS

A. Manual Outdoor-Air Damper

All units (except those equipped with a factory-installed economizer) have a manual outdoor-air damper to provide ventilation air. Damper can be preset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move damper to desired setting. Then retighten screws to secure damper (Fig. 13).

B. Optional Economizer

Economizer Motor Control Module (Fig. 14-16)

Set to the "D" setting (Fig. 15). The control module is located on the economizer motor. See Fig. 14 and 16.

Damper Vent Position Setting

1. Set fan switch at ON position (continuous fan operation) and close night switch if used.
2. Set system selector switch to OFF position.
3. Turn adjustment screw slowly until dampers assume desired vent position. *Do not manually operate economizer motor since damage to motor will result.*

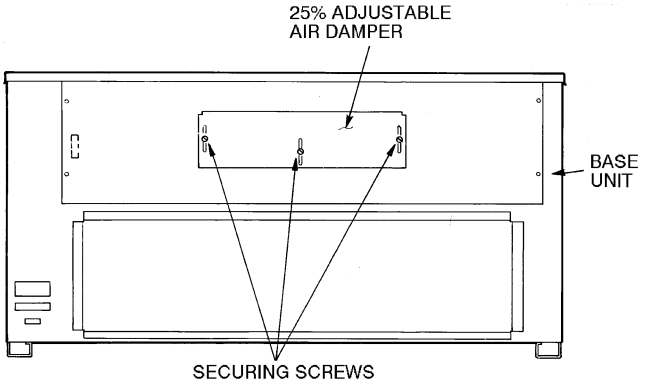


Fig. 13 — 25% Outdoor-air Section Details

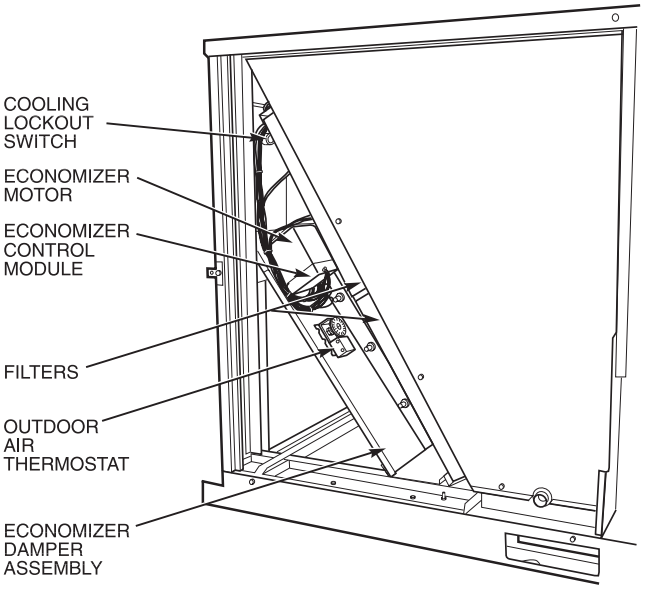
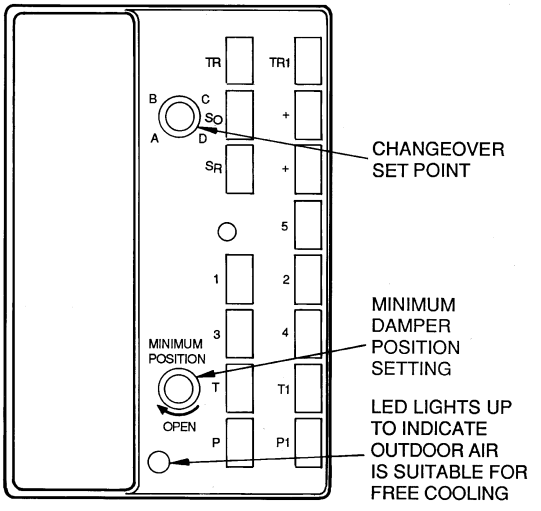


Fig. 14 — Economizer Damper Assembly — End View

Table 3 — Heat Anticipator Settings

UNIT 559F	UNIT VOLTAGES	kW*	STAGE 1	STAGE 2
180-300	208/230-3-60	26/34	.40	.66
		42/56	.66	.40
		56/75	.66	.66
	460-3-60	32	.40	.40
		55	.40	.66
		80	.66	.66

*Heater kW is based on heater voltage of 208 v, 240 v and 480 v.



LEGEND

LED — Light-Emitting Diode

Fig. 15 — Economizer Control Module (Part Number W7459A)

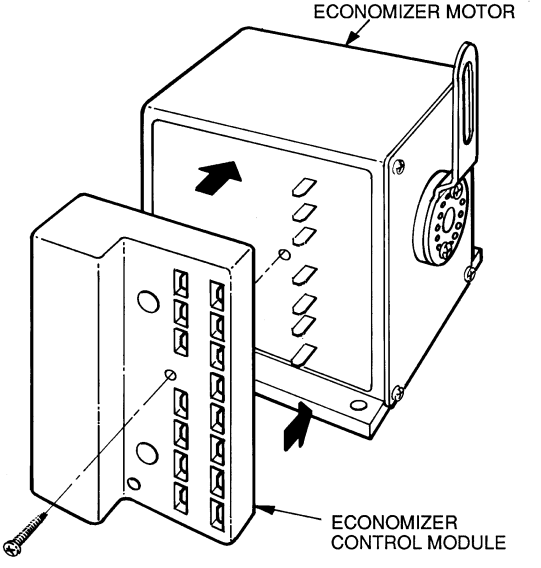


Fig. 16 — Economizer Control Module Location

VIII. STEP 8 — INSTALL OUTDOOR-AIR HOOD

The same type of factory-installed hood is used on units with 25% air ventilation and units with an economizer.

NOTE: The hood top panel, upper and lower filter retainers, hood drain pan, baffle (size 300), and filter support bracket are secured opposite the condenser end of the unit. The screens, hood side panels, remaining section of filter support bracket, seal strip, and all other hardware are in a package located inside the return-air filter access panel (Fig. 17).

1. Attach seal strip to upper filter retainer. See Fig. 18.
2. Assemble hood top panel and side panels, upper filter retainer, and hood drain pan (Fig. 19).
3. Secure lower filter retainer and long section of filter support bracket to unit. See Fig. 19. Leave screws loose on size 300 units.
4. Slide baffle (size 300) unit behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for base unit top panel located above outdoor-air inlet opening, and remove screws for hood side panels located on the sides of the outdoor-air inlet opening.
6. Match notches in hood top panel to unit top panel screws. Insert hood flange between unit top panel flange and unit. Tighten screws.
7. Hold hood side panel flanges flat against unit, and install screws removed in Step 5.
8. Insert outdoor-air inlet screens and spacer in channel created by lower filter retainer and filter support bracket.
9. Attach remaining short section of filter support bracket.

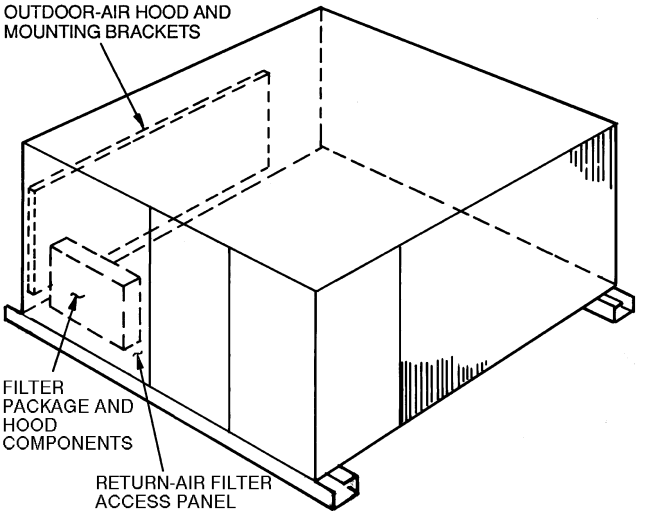


Fig. 17 — Outdoor-Air Hood Component Location

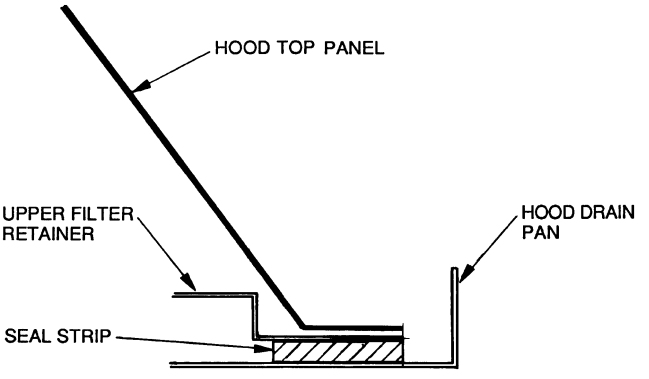
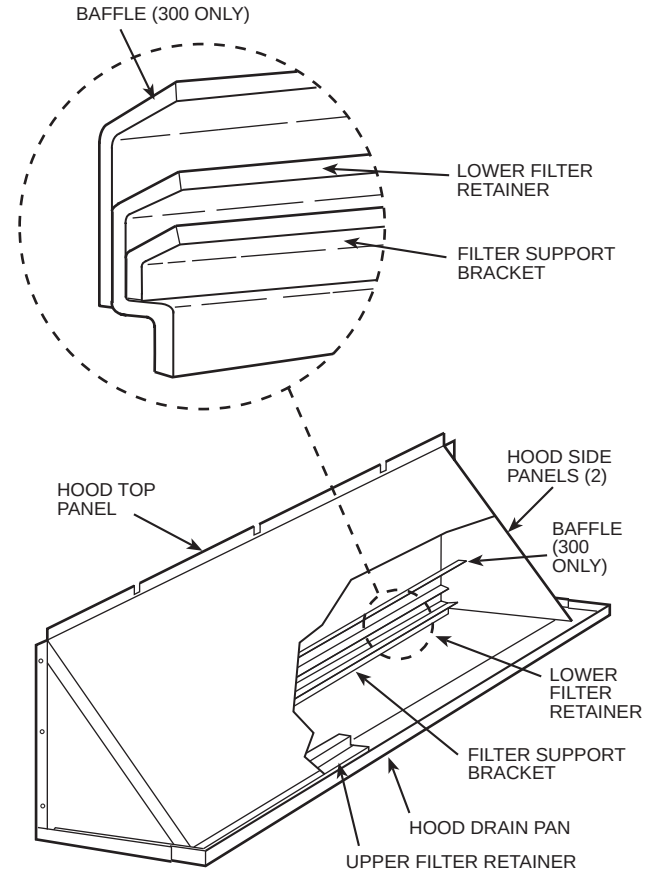


Fig. 18 — Seal Strip Location (Air Hood Cross-Sectional View)



NOTE: The outdoor-air hood comes with a baffle which is used on size 300 units only; discard baffle for 180-240 units.

Fig. 19 — Outdoor-Air Hood Details

A. Enthalpy Control Installation

NOTE: The accessory outdoor-air enthalpy sensor must be installed BEFORE the economizer hoods are installed on the unit or hoods will have to be removed.

1. Remove and discard the factory-installed jumper assembly containing the 800-ohm resistor on the economizer control module (between terminals S_R and +). See Fig. 15.
2. Remove black wire assembly containing the 620-ohm resistor from between economizer control module terminal S_O and the outdoor-air thermostat (OAT). Place this wire assembly (containing the 620-ohm resistor) between economizer control module terminals S_R and +, replacing the jumper removed in Step 1. See Fig. 15.
3. Disconnect the blue wire from the OAT.
4. Remove OAT from the outside of the economizer (see Fig. 14).
5. Mount the enthalpy sensor (Fig. 20) to the economizer on the outside of the unit (in the same location from which the OAT was removed) using the 2 screws provided. See Fig. 14.
6. Reconnect the blue wire removed in Step 3 to the enthalpy sensor terminal +.
7. Cut the violet wire provided to desired length and terminate with quick-connect terminal provided. Route the violet wire from the enthalpy sensor terminal S, through the snap bushing, and to the economizer control module terminal S_O. See Fig. 15.
8. Set changeover set point to the desired location. See Fig. 21.

NOTE: For maximum benefit of outdoor air, set the enthalpy control to the "A" setting. At this setting, when the relative humidity is 50% and the outdoor air is below 74 F, the relay contacts on the sensor will be closed.

9. Reinstall economizer hoods if removed.

IMPORTANT: Be sure all seal strips and RTV sealant are intact. A watertight seal to inside of unit must be maintained.

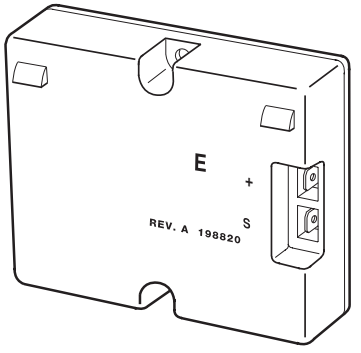
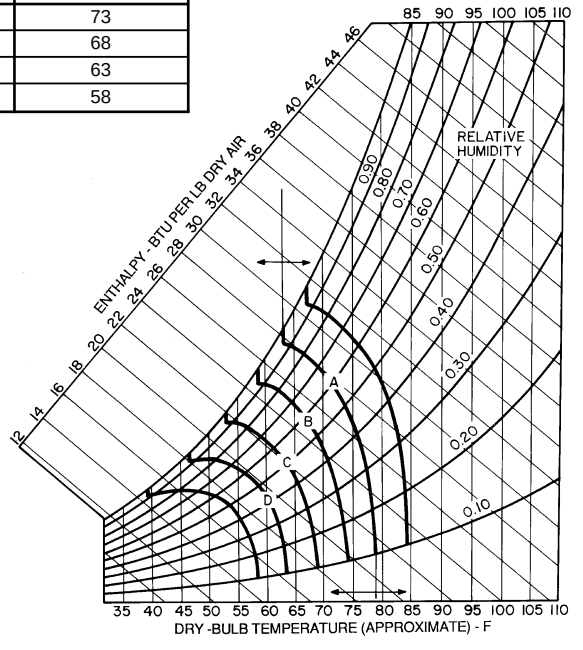


Fig. 20 — Outdoor-Air and Return-Air Enthalpy Sensor

CONTROL CURVE	CONTROL POINT (Approx Deg) AT 50% RH
A	73
B	68
C	63
D	58



RH — Relative Humidity

Fig. 21 — Psychrometric Chart for Solid-State Enthalpy Control

B. Differential Enthalpy Control

NOTE: The accessory outdoor-air enthalpy sensor must be installed BEFORE the economizer hoods are installed on the unit or hoods will have to be removed.

1. Remove and discard the factory-installed jumper assembly containing the 800-ohm resistor on the economizer control module (between terminals S_R and +. See Fig. 15.
2. Disconnect black wire from economizer control module terminal S_O and blue wire from the OAT (outdoor-air thermostat).
3. Remove OAT and black wire assembly containing the 620-ohm resistor from the outside of the economizer (see Fig. 14).
4. Mount the outdoor-air enthalpy sensor (first sensor) to the economizer on the outside of the unit (in the same location from which the OAT was removed) using the 2 screws provided. See Fig. 14.
5. Reconnect the blue wire removed in Step 2 to the enthalpy sensor terminal +.
6. Cut the violet wire provided to desired length and terminate with quick-connect terminal provided. Route the violet wire from the enthalpy sensor terminal S, through the snap bushing, and to the economizer control module terminal S_O.
7. Mount the second enthalpy sensor in the return-air duct (return-air sensor).
8. Route the blue wire (provided) from terminal + on the return-air enthalpy sensor to the economizer control module terminal +.
9. Route the violet wire (provided) from terminal S on the return-air enthalpy sensor to the economizer control module terminal S_R.
10. Turn changeover set point dial clockwise past the "D" setting, or the control will not operate on a differential. See Fig. 15.
11. Reinstall economizer hood if removed.

IMPORTANT: Be sure all seal strips and RTV sealant are intact. A watertight seal to inside of unit must be maintained.

IX. STEP 9 — INSTALL ALL ACCESSORIES

After all the factory-installed options have been adjusted, install all field-installed accessories. Refer to the accessory installation instructions included with each accessory.

A. Motormaster® I Control Installation (559F180 and 216)

Install Field-Fabricated Wind Baffles

Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low ambient temperatures. See Fig. 22 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be ¼-in. diameter and ⅝-in. long. Drill required screw holes for mounting baffles.

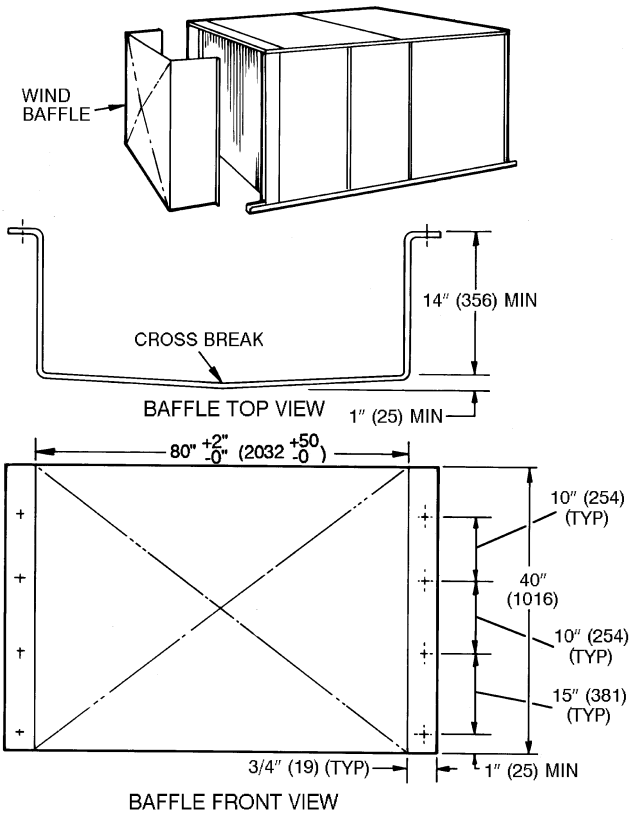
⚠ **CAUTION:** To avoid damage to the refrigerant coils and electrical components, use recommended screw sizes only. Use care when drilling holes.

Install Motormaster® I Controls

Only one Motormaster I control is required per unit. The Motormaster I control must be used in conjunction with the Accessory 0° F Low Ambient Kit (purchased separately). The Motormaster I device controls outdoor fan no. 1 while outdoor fans no. 2 and 3 are sequenced off by the Accessory 0° F Low Ambient Kit.

Accessory 0° F Low Ambient Kit — Install the Accessory 0° F Low Ambient Kit per instruction supplied with accessory.

Motor Mount — To ensure proper fan height, replace the existing motor mount with the new motor mount provided with accessory.



NOTE: Dimensions in ( ) are in mm.

Fig. 22 — Wind Baffle Details

Transformer (460-v Units Only) — On 460-v units, a transformer is required. The transformer is provided with the accessory and must be field-installed.

Sensor Assembly — Install the sensor assembly in the location shown in Fig. 23.

Motormaster® I Control — Recommended mounting location is on the inside of the panel to the left of the control box. The control should be mounted on the inside of the panel, vertically, with leads protruding from bottom of extrusion.

B. Motormaster III Control Installation (559F240 and 300)

Install Field-Fabricated Wind Baffles

Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low ambient temperatures. See Fig. 22 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be ¼-in. diameter and ⅝-in. long. Drill required screw holes for mounting baffles.

⚠ **CAUTION:** To avoid damage to the refrigerant coils and electrical components, use recommended screw sizes only. Use care when drilling holes.

Replace Outdoor Motor

Replace outdoor fan motor no. 1 with motor included in accessory kit. Existing motor is not Motormaster III compatible.

Install Motormaster III Controls

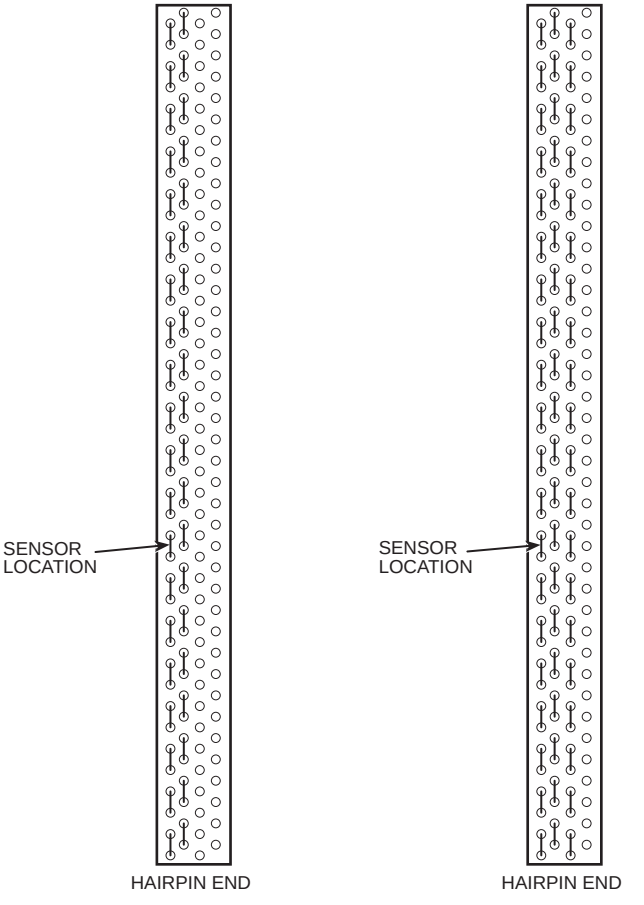
Only one Motormaster III control is required per unit.

Sensor — Install the sensor for thermistor input control in the location shown in Fig. 24. Connect sensor leads to the purple and grey control signal leads on the Motormaster III control.

Signal Selection Switch — Remove the cover of the Motormaster III control. Set the switch to accept the thermistor sensor input signal. Set the frequency to match the unit power supply (60 Hz).

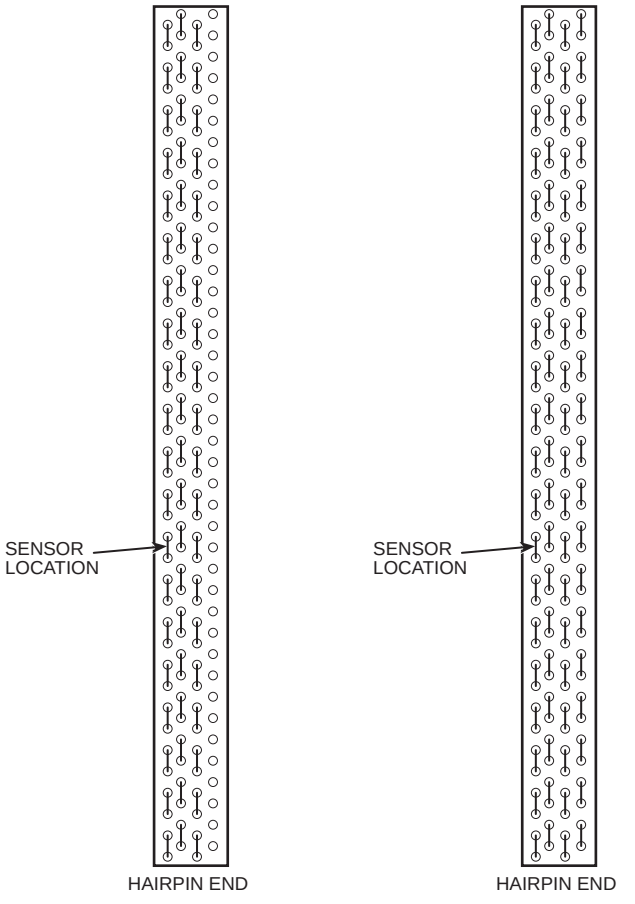
Motormaster III Control — Recommended mounting location is beneath the control box, mounted to the partition that separates the control box section from the indoor section.

NOTE: If unit power is supplied through the roof curb and basepan of the unit, mount the Motormaster III control on the corner post adjacent to the conduit running from the basepan to the bottom of the control box.



NOTE: All sensors are located on the eighth hairpin up from the bottom.

Fig. 23 — Motormaster I Sensor Locations



NOTE: All sensors are located on the eighth hairpin up from the bottom.

Fig. 24 — Motormaster® III Sensor Locations

START-UP

Use the following information and Start-Up Checklist on page CL-1 to check out unit PRIOR to start-up.

I. UNIT PREPARATION

Check that unit has been installed in accordance with these installation instructions and all applicable codes.

II. SERVICE VALVES

Ensure that optional suction, discharge, and standard liquid line service valves are open. Damage to the compressor could result if they are left closed.

III. INTERNAL WIRING

Check all electrical connections in unit control boxes; tighten as required.

IV. CRANKCASE HEATER(S)

Heater(s) is energized as long as there is power to unit and compressor is operating.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

V. COMPRESSOR MOUNTING

Compressors are internally spring mounted. Do not loosen or remove compressor holddown bolts.

VI. REFRIGERANT SERVICE PORTS

Each refrigerant system has a total of 3 Schrader-type service gage ports. One port is located on the suction line, one on the compressor discharge line, and one on the liquid line. In addition, Schrader-type valves are located underneath the low-pressure switches. Be sure that caps on the ports are tight.

VII. COMPRESSOR ROTATION

It is important to be certain the compressors are rotating in the proper direction. To determine whether or not compressors are rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit.
3. Reverse any two of the incoming power leads.
4. Turn on power to the compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When compressors are rotating in the wrong direction, the unit will have increased noise levels and will not provide heating and cooling.

After a few minutes of reverse operation, the scroll compressor internal overload protection will open, which will activate the unit's lockout and requires a manual reset. Reset is accomplished by turning the thermostat on and off.

VIII. EVAPORATOR FAN

Fan belt and variable pulleys are factory installed. Remove tape from the fan pulley. See Table 4 for Air Quantity Limits. See Tables 5-7 for Fan Performance data. Be sure that fans rotate in the proper direction. See Tables 8 and 9 for Static Pressure information for accessories and options. See Table 10 for fan rpm at various fan motor pulley settings. To alter fan performance, see Evaporator-Fan Performance Adjustment section, page 21.

Table 4 — Air Quantity Limits

UNIT 559F	MINIMUM CFM	MAXIMUM CFM
180	4500	7,500
216	5400	9,000
240	6000	10,000
300	7000	11,250

IX. CONDENSER FANS AND MOTORS

Fans and motors are factory set. Refer to Condenser-Fan Adjustment section (page 22) as required.

X. RETURN-AIR FANS

Check that correct filters are installed in filter tracks. See Table 1. Do not operate unit without return-air filters.

XI. OUTDOOR-AIR INLET SCREENS

Outdoor-air inlet screens must be in place before operating unit.

XII. ACCESSORY ECONOMIZER ADJUSTMENT

Remove filter access panel. Check that outdoor-air damper is closed and return-air damper is open.

Economizer operation and adjustment is described in Base Unit Operation and Economizer Adjustment sections (pages 20 and 22), respectively.

Table 5 — Fan Performance — 559F180

559F180 (15 TONS)																		
Airflow (Cfm)	Available External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	684	1.28	1102	791	1.49	1283	887	1.70	1466	977	1.92	1652	1061	2.13	1841	1139	2.36	2034
4800	715	1.47	1265	817	1.68	1451	910	1.90	1638	997	2.12	1828	1078	2.34	2021	1155	2.57	2217
5100	747	1.67	1442	844	1.89	1633	934	2.12	1825	1018	2.34	2019	1097	2.57	2216	1171	2.80	2416
5400	779	1.90	1635	872	2.12	1831	959	2.35	2027	1040	2.58	2226	1117	2.81	2426	1189	3.05	2629
5700	812	2.14	1844	901	2.37	2044	985	2.60	2245	1063	2.84	2448	1138	3.07	2652	1209	3.31	2858
6000	845	2.40	2068	931	2.64	2273	1011	2.87	2478	1087	3.11	2685	1160	3.35	2893	1229	3.60	3103
6300	878	2.68	2309	961	2.92	2518	1039	3.16	2728	1112	3.41	2939	1183	3.65	3151	1250	3.90	3365
6600	912	2.98	2566	992	3.22	2780	1067	3.47	2994	1138	3.72	3209	1207	3.97	3425	1273	4.22	3642
6900	946	3.29	2841	1023	3.55	3059	1096	3.80	3277	1165	4.05	3496	1232	4.31	3716	—	—	—
7200	981	3.63	3133	1055	3.89	3355	1125	4.15	3578	—	—	—	—	—	—	—	—	—
7500	1016	3.99	3443	1087	4.25	3669	—	—	—	—	—	—	—	—	—	—	—	—

559F180 (15 TONS) (cont)															
Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.4			1.6			1.8			1.9			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
4500	1214	2.59	2230	1285	2.82	2430	1353	3.05	2633	1386	3.17	2736	1418	3.29	2839
4800	1228	2.80	2417	1297	3.04	2619	1364	3.27	2825	1396	3.40	2928	1428	3.52	3033
5100	1243	3.04	2618	1311	3.27	2823	1376	3.51	3031	1408	3.64	3136	1439	3.76	3242
5400	1259	3.29	2835	1326	3.53	3043	1390	3.77	3254	1421	3.90	3360	1452	4.02	3467
5700	1277	3.56	3067	1342	3.80	3278	1405	4.05	3492	1435	4.17	3600	1466	4.30	3708
6000	1295	3.84	3316	1359	4.09	3530	1421	4.34	3746	—	—	—	—	—	—
6300	1315	4.15	3580	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	——	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

NOTES:
1. Standard low-medium static drive range is 891 to 1179 rpm. Alternate high-static drive range is 1227 to 1550. Other rpms require a field-supplied drive.
2. Maximum continuous bhp is 4.25 and the maximum continuous watts are 3775. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Table 8 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
7. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 6 — Fan Performance — 559F216 and 240

559F216 and 240 (18 and 20 TONS)																		
Airflow (Cfm)	Available External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5,500	682	1.99	1675	760	2.29	1922	832	2.59	2177	901	2.90	2441	965	3.22	2712	1027	3.56	2990
6,000	730	2.38	2005	802	2.68	2257	871	2.99	2516	935	3.31	2783	997	3.63	3057	1056	3.97	3337
6,500	778	2.82	2373	846	3.13	2630	911	3.44	2893	972	3.76	3164	1031	4.09	3440	1087	4.43	3722
7,000	828	3.31	2780	892	3.62	3042	953	3.94	3310	1011	4.26	3583	1067	4.59	3863	1121	4.93	4148
7,500	878	3.84	3227	938	4.15	3494	996	4.48	3766	1051	4.81	4043	1105	5.14	4326	1156	5.49	4613
8,000	928	4.42	3715	985	4.74	3986	1040	5.07	4263	1093	5.40	4544	1144	5.74	4830	1194	6.09	5120
8,500	979	5.05	4245	1033	5.38	4521	1085	5.71	4801	1136	6.05	5086	1185	6.39	5375	1232	6.74	5669
9,000	1030	5.73	4817	1082	6.06	5098	1131	6.40	5382	1180	6.74	5671	1227	7.09	5964	1272	7.44	6260
9,500	1082	6.46	5433	1131	6.80	5718	1178	7.14	6007	1225	7.49	6299	1270	7.84	6595	1313	8.20	6895
10,000	1134	7.25	6093	1180	7.59	6382	1226	7.94	6675	1270	8.29	6971	1313	8.65	7271	1356	9.01	7574

559F216 and 240 (18 and 20 TONS) (cont)															
Airflow (Cfm)	Available External Static Pressure (in. wg)														
	1.4			1.6			1.8			1.9			2.0		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
5,500	1086	3.89	3275	1142	4.24	3567	1197	4.59	3864	1223	4.77	4015	1249	4.96	4167
6,000	1112	4.31	3623	1167	4.66	3915	1219	5.01	4213	1245	5.19	4364	1270	5.37	4516
6,500	1142	4.77	4010	1194	5.12	4304	1245	5.47	4602	1270	5.65	4754	1294	5.83	4906
7,000	1173	5.28	4438	1224	5.63	4733	1273	5.98	5033	1296	6.17	5184	1320	6.35	5337
7,500	1207	5.83	4906	1255	6.19	5203	1302	6.55	5504	1326	6.73	5657	1348	6.91	5810
8,000	1242	6.44	5415	1289	6.80	5714	1334	7.16	6018	1357	7.34	6171	1379	7.52	6325
8,500	1279	7.10	5966	1324	7.45	6268	1368	7.82	6573	1389	8.00	6728	1411	8.18	6883
9,000	1317	7.80	6561	1360	8.16	6865	1403	8.53	7173	1424	8.71	7328	1445	8.90	7484
9,500	1356	8.56	7198	1398	8.93	7505	1440	9.29	7815	1460	9.48	7972	1480	9.67	8129
10,000	1397	9.37	7881	1438	9.74	8190	1477	10.11	8503	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

NOTES:

1. Standard low-medium static drive range for the 216 size is 910 to 1095 rpm. Standard low-medium static drive range for the 240 size is 1002 to 1225 rpm. Alternate high-static drive range for the 216 size is 1069 to 1287. Alternate high-static drive range for the 240 size is 1193 to 1458 rpm. Other rpms require a field-supplied drive.
2. Maximum continuous bhp for the 216 size is 5.90. Maximum continuous bhp for the 240 size is 8.7 (208/230 v) or 9.5 (460 v). The maximum continuous watts for the 216 size is 5180. The maximum continuous watts for the 240 size is 7915 (208/230 v) or 8640 (460 v). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
7. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 7 — Fan Performance — 559F300

559F300 (25 TONS)																		
Airflow (Cfm)	Available External Static Pressure (in. wg)																	
	0.2			0.4			0.6			0.8			1.0			1.2		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
7,000	845	3.26	2693	909	3.60	2979	969	3.96	3272	1028	4.32	3574	1083	4.70	3883	1137	5.08	4,200
7,500	896	3.82	3156	956	4.17	3450	1014	4.54	3752	1069	4.91	4060	1123	5.29	4375	1174	5.68	4,698
8,000	948	4.43	3667	1005	4.80	3969	1060	5.17	4278	1112	5.56	4593	1163	5.94	4915	1213	6.34	5,243
8,500	1001	5.11	4226	1054	5.49	4537	1106	5.87	4853	1156	6.26	5175	1205	6.66	5504	1253	7.06	5,838
9,000	1053	5.85	4836	1104	6.23	5155	1154	6.63	5478	1202	7.02	5808	1248	7.43	6142	1294	7.84	6,483
9,500	1106	6.65	5498	1155	7.04	5824	1202	7.44	6155	1248	7.85	6492	1293	8.26	6833	1336	8.68	7,179
10,000	1159	7.52	6214	1206	7.92	6547	1251	8.33	6886	1295	8.74	7229	1338	9.16	7577	1380	9.59	7,929
10,500	1213	8.45	6984	1257	8.86	7325	1300	9.28	7671	1342	9.70	8020	1384	10.13	8375	1424	10.56	8,733
11,000	1266	9.45	7810	1309	9.87	8159	1350	10.29	8511	1391	10.73	8868	1431	11.16	9229	1470	11.60	9,594
11,250	1293	9.97	8245	1334	10.40	8597	1375	10.83	8953	1415	11.26	9313	1454	11.70	9677	1493	12.15	10,045

559F300 (25 TONS) (cont)									
Airflow (Cfm)	Available External Static Pressure (in. wg)								
	1.4			1.6			1.8		
	Rpm	Bhp	Watts	Rpm	Bhp	Watts	Rpm	Bhp	Watts
7,000	1189	5.47	4,524	1239	5.87	4,854	1288	4.91	5191
7,500	1224	6.08	5,026	1272	6.48	5,362	1320	5.56	5703
8,000	1261	6.75	5,577	1307	7.16	5,917	1353	6.26	6263
8,500	1299	7.47	6,177	1344	7.89	6,523	1388	7.02	6873
9,000	1338	8.26	6,828	1382	8.68	7,179	1424	7.85	7534
9,500	1379	9.11	7,530	1421	9.54	7,887	1462	8.74	8247
10,000	1421	10.02	8,286	1461	10.46	8,648	1501	9.70	9014
10,500	1464	11.00	9,096	1503	11.45	9,464	1541	10.73	9835
11,000	1508	12.05	9,963	1546	12.50	10,336	—	—	—
11,250	1530	12.60	10,417	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

NOTES:
1. Standard low-medium static drive range is 1066 to 1283 rpm. Alternate high-static drive range is 1332 to 1550. Other rpms require a field-supplied drive.
2. Maximum continuous bhp is 10.2 (208/230 v) or 11.8 (460 v) and the maximum continuous watts are 9510 (208/230 v) or 11,000 (460 v). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Table 9 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
7. Use of a field-supplied motor may affect wiring size. Contact your Bryant representative for details.

Table 8 — Accessory/FIOP Static Pressure (in. wg) — 559F180

COMPONENT	CFM				
	4500	5000	6000	7200	7500
Economizer	0.04	0.05	0.07	0.09	0.10
Glycol Coil	0.22	0.26	0.35	0.44	0.46
Electric Heat (kW)					
26/34	0.06	0.07	0.09	0.11	0.12
32	0.06	0.07	0.09	0.11	0.12
42/56	0.07	0.08	0.12	0.16	0.17
55	0.07	0.08	0.12	0.15	0.17
56/75	0.09	0.10	0.15	0.20	0.21
80	0.09	0.10	0.15	0.20	0.21

LEGEND

FIOP — Factory-Installed Option

NOTES:
1. The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.
2. Heaters are rated at 208/240 v and 480 v.

Table 9 — Accessory/FIOP Static Pressure (in. wg) — 559F216-300

COMPONENT	CFM					
	5400	6000	7200	9000	10,000	11,250
Economizer	0.06	0.07	0.09	0.11	0.12	0.14
Glycol Coil	0.30	0.35	0.44	0.58	0.66	0.77
Electric Heat (kW)						
26/34	0.08	0.09	0.11	0.15	0.17	0.20
32	0.08	0.09	0.11	0.15	0.17	0.20
42/56	0.11	0.12	0.15	0.19	0.21	0.24
55	0.11	0.12	0.15	0.19	0.21	0.24
56/75	0.14	0.15	0.20	0.24	0.26	0.29
80	0.14	0.15	0.20	0.24	0.26	0.29

LEGEND

FIOP — Factory-Installed Option

NOTES:
1. The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance tables to determine blower rpm and watts.
2, Heaters are rated at 208/240 v and 480 v.

Table 10 — Fan Rpm at Motor Pulley Settings*

UNIT 559F	MOTOR PULLEY TURNS OPEN												
	0	½	1	1½	2	2½	3	3½	4	4½	5	5½	6
180†	††	††	1179	1150	1121	1093	1064	1035	1006	978	949	920	891
180**	††	††	1559	1522	1488	1455	1422	1389	1356	1323	1289	1256	1227
216†	††	††	1095	1077	1058	1040	1021	1002	984	965	947	928	910
216**	††	††	1287	1265	1243	1222	1200	1178	1156	1134	1112	1091	1069
240†	††	††	1225	1209	1187	1165	1143	1120	1098	1076	1053	1031	1002
240**	††	††	1458	1434	1407	1381	1354	1328	1301	1275	1248	1222	1193
300†	††	††	1283	1269	1247	1225	1203	1182	1160	1138	1116	1095	1066
300**	††	††	—	—	1551	1524	1497	1470	1443	1415	1388	1361	1332

*Approximate fan rpm shown.
†Indicates standard drive package.
**Indicates alternate drive package.
††Due to belt and pulley size, pulley cannot be set to this number of turns open.

NOTE: For speeds not listed above, field-supplied drives are required.

XIII. BASE UNIT OPERATION

A. Cooling, Units Without Economizer

When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), and compressor contactor no. 1 (C1) are energized and evaporator-fan motor, compressor no. 1 and condenser fans start. The condenser-fan motors run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

B. Heating, Units Without Economizer (If Accessory or Optional Heater is Installed)

Upon a call for heating through terminal W1, IFC and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

C. Cooling, Units With Economizer

Upon a call for cooling, when outdoor ambient temperature is above the outdoor-air temperature control setting, the evaporator and condenser fans and compressor energize. The economizer damper moves to VENT position.

Upon a first-stage call for cooling, when outdoor ambient temperature is below the temperature control setting, the evaporator fan starts and economizer damper modulates to maintain mixed-air temperature. The compressor(s) remains off.

Upon a second-stage call for cooling, compressor no. 1 is energized and mechanical cooling is integrated with economizer cooling. Compressor no. 2 is locked out. If the outdoor-air temperature is below 50 F, a cooling lockout switch prevents the compressor(s) from running.

When supply-air temperature drops below a fixed set point, the economizer damper modulates to maintain the temperature at the fixed set point.

D. Freeze Protection Thermostat

A freeze protection thermostat (FPT) is located on the evaporator coil. It detects frost build-up and turns off the compressor, allowing the coil to clear. Once frost has melted, the compressor can be reenergized by resetting the compressor lockout.

E. Heating, Units With Economizer (If Accessory or Optional Heater Is Installed)

The outdoor air damper stays at VENT position while the evaporator fan is operating. Upon a call for heating through terminal W1, the indoor (evaporator) fan contactor (IFC) and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

SERVICE

⚠ **WARNING:** Before performing service or maintenance operations on unit, turn off main power switch to unit. Turn off accessory heater power switch if applicable. Electrical shock could cause personal injury.

I. CLEANING

Inspect unit interior at beginning of each heating and cooling season and as operating conditions require. Remove unit top panel and/or side panels for access to unit interior.

A. Evaporator Coil

Clean as required with a commercial coil cleaner.

NOTE: The 559F300 unit has a mist eliminator screen attached to the evaporator coil to prevent condensate runoff at high wet-bulb conditions. Check periodically and clean as necessary.

B. Condenser Coil

Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly — clean as required.

C. Condensate Drain

Check and clean each year at start of cooling season.

D. Filters

Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Table 1 for type and size.

NOTE: The 559F300 unit requires industrial grade throwaway filters capable of withstanding face velocities up to 625 fpm. Ensure that replacement filters for the 559F300 units are rated for 625 fpm.

E. Outdoor-Air Inlet Screens

Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens.

II. LUBRICATION

A. Compressors

Each compressor is charged with the correct amount of oil at the factory. Conventional white oil (Sontext 200LT) is used. White oil is compatible with 3GS oil, and 3GS oil may be used if the addition of oil is required. See compressor nameplate for original oil charge. A complete recharge should be four ounces less than the original oil charge. When a compressor is exchanged in the field it is possible that a major portion of the oil from the replaced compressor may still be in the system. While this will not affect the reliability of the replacement compressor, the extra oil will add rotor drag and increase power usage. To remove this excess oil, an access valve may be added to the lower portion of the suction line at the inlet of the compressor. The compressor should then be run for 10 minutes, shut down, and the access valve opened until no oil flows. This should be repeated twice to make sure the proper oil level has been achieved.

B. Fan Shaft Bearings

For size 180 units, bearings are permanently lubricated. No field lubrication is required. For size 216-300 units, the bearings are of the pillow block type and have grease fittings. The bearing opposite the motor end has an extended tube line so it can be lubricated from the motor side. Lubricate the bearings twice annually.

Typical lubricants are given below:

MANUFACTURER	LUBRICANT
Texaco	Regal AFB-2*
Mobil	Mobilplex EP No. 1
Sunoco	Prestige 42
Texaco	Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

C. Condenser and Evaporator-Fan Motor Bearings

The condenser and evaporator-fan motors have permanently-sealed bearings, so no field lubrication is necessary.

III. EVAPORATOR FAN PERFORMANCE ADJUSTMENT (Fig. 25-27)

Fan motor pulleys are factory set for speed shown in Table 1. To change fan speeds:

1. Shut off unit power supply.
2. a. Size 180 Only: Loosen belt by loosening fan motor mounting plate nuts.
   b. Size 216-300 Only: Loosen nuts on the 2 carriage bolts in the motor mounting base. Install jacking bolt and plate under motor base (bolt and plate are shipped in installer's packet). See Fig. 25. Using bolt and plate, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
3. Loosen movable-pulley flange setscrew (see Fig. 25).
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.

   See Table 4 for air quantity limits.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)
6. Replace and tighten belts. See Belt Tension Adjustment section on page 22.

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft.
3. Make angular alignment by loosening motor from mounting plate.

IV. EVAPORATOR FAN SERVICE AND REPLACEMENT

A. 559F180 Units (See Fig. 26)

NOTE: To remove belts only, follow Steps 1-6.

1. Remove filter and supply-air section panels.
2. Remove unit top panel.
3. Loosen carriage nuts A and B holding motor mount assembly to fan scroll side plates.
4. Loosen screw C.
5. Rotate motor mount assembly (with motor attached) as far as possible away from evaporator coil.
6. Remove belt.
7. Rotate motor mount assembly back past original position toward evaporator coil.
8. Remove motor mounting nuts D and E (both sides).
9. Lift motor up through top of unit.
10. Reverse above procedure to reinstall motor.
11. Check and adjust belt tension as necessary.

B. 559F216-300 Units (See Fig. 27)

The 559F216-300 units use a fan motor mounting system that features a slide-out motor mounting plate. To replace or service the motor, slide out the bracket.

1. Remove the evaporator-fan access panel and the heating control access panel.
2. Remove the center post (located between the evaporator fan and heating control access panels) and all screws securing it.
3. Loosen nuts on the two carriage bolts in the motor mounting base.

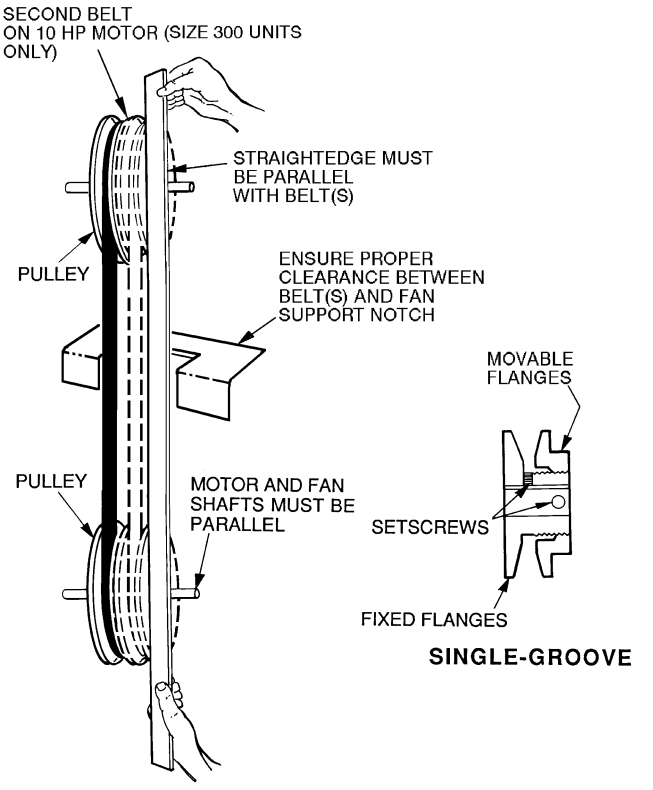


Fig. 25 — Evaporator-Fan Pulley Alignment and Adjustment

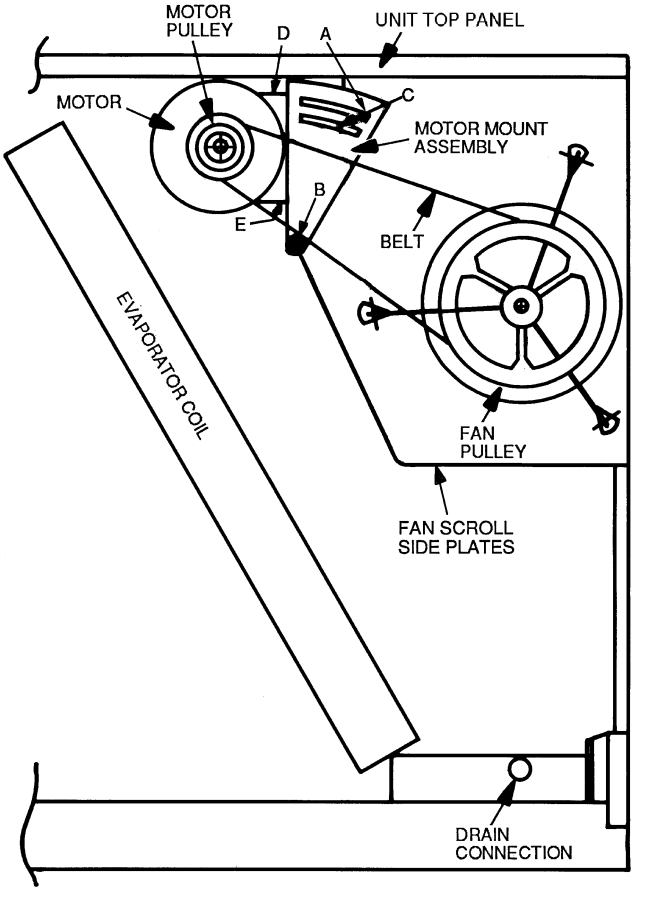
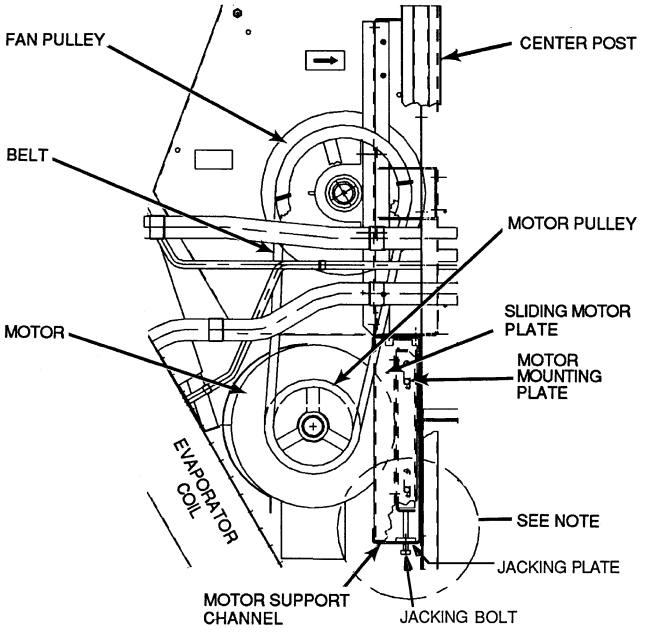


Fig. 26 — 559F180 Evaporator-Fan Motor Section

4. Using jacking bolt under motor base, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
5. Remove the belt drive.
6. Remove jacking bolt and tapped jacking bolt plate.
7. Remove the 2 screws that secure the motor mounting plate to the motor support channel.
8. Remove the 3 screws from the end of the motor support channel that interfere with the motor slide path.
9. Slide out the motor and motor mounting plate.
10. Disconnect wiring connections and remove the 4 mounting bolts.
11. Remove the motor.
12. To install the new motor, reverse Steps 1-11.



NOTE: A 2½-in. bolt and threaded plate are included in the installer's packet. They should be added to the motor support channel below the motor mounting plate to aid in raising the motor. The plate part number is 50DP503842. The adjustment bolt is ⅜ - 16 x 1¾-in. LG.

Fig. 27 — 559F216-300 Evaporator-Fan Motor Section

V. BELT TENSION ADJUSTMENT

To adjust belt tension:

1. Loosen fan motor bolts.
2. Adjust belt tension:
   a. Size 180 Units: Move motor mounting plate up or down for proper belt tension (½ in. deflection with one finger).
   b. Size 216-300 Units: Turn motor jacking bolt to move motor mounting plate up or down for proper belt tension (⅜ in. deflection at midspan with one finger [9 lb force]).
3. Tighten nuts.
4. Adjust bolts and nut on mounting plate to secure motor in fixed position.

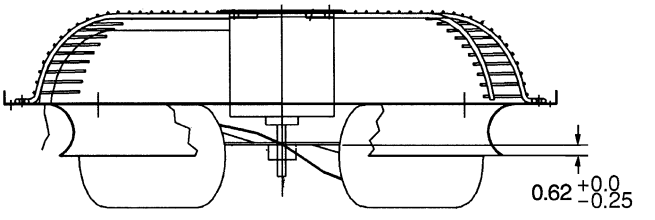
VI. CONDENSER-FAN ADJUSTMENT

A. 559F180-216 Units (Fig. 28)

1. Shut off unit power supply.
2. Remove access panel(s) closest to the fan to be adjusted.
3. Loosen fan hub setscrews.
4. Adjust fan height on shaft using a straightedge placed across the fan orifice.
5. Tighten setscrews and replace panel(s).
6. Turn on unit power.

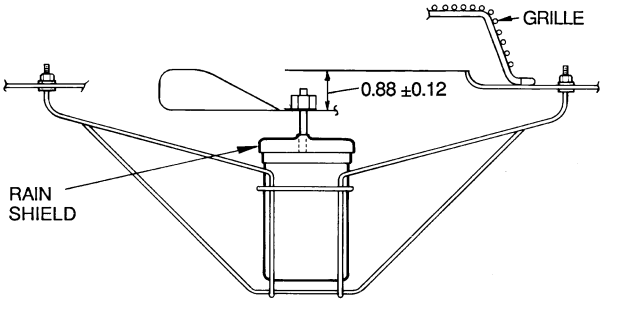
B. 559F240,300 Units (Fig. 29)

1. Shut off unit power supply.
2. Remove fan top-grille assembly and loosen fan hub screws.
3. Adjust fan height on unit, using a straightedge placed across the fan orifice.
4. Tighten setscrews and replace rubber hubcap to prevent hub from rusting to motor shaft.
5. Fill hub recess with permagum if rubber hubcap is missing.



NOTE: Dimensions are in inches.

Fig. 28 — Condenser Fan Adjustment, 559F180,216



NOTE: Dimensions are in inches.

Fig. 29 — Condenser-Fan Adjustment, 559F240,300

VII. ECONOMIZER ADJUSTMENT

See Tables 11 and 12 for checkout and outdoor-air temperature simulation. Make certain the outdoor-air damper is fully closed and the return-air damper is fully open before completing the following steps.

1. Turn on power to the unit.
2. Turn the thermostat fan switch to the ON position. The damper will go to the vent position.
3. Adjust the vent position with the minimum damper position adjustment on the module. See Fig. 15.
4. Set the system selector switch to COOL position and set the cooling temperature selector to its lowest setting.

NOTE: The Cooling mode may also be simulated by removing the thermostat wires from terminals Y1 and Y2 and installing a jumper between terminals R and Y1. Refer to unit label diagram for terminal locations.

Table 11 — Economizer Checkout Procedures

TEST PROCEDURE	RESULTS
A. Disconnect power at TR and TR1. Disconnect jumper between P and P1. See Fig. 15. B. Jumper TR to 1. C. Jumper T1 to T. D. Disconnect outdoor-air thermostat connections from S_O and +. Factory-installed 800 ohm resistor should remain connected to S_R and +. E. Reconnect power to terminals TR and TR1.	1. LED (light-emitting diode) should be off. 2. Motor is in closed position.

TEST PROCEDURE	RESULTS
A. Disconnect factory-installed resistor from terminals S_R and +.	1. LED (light-emitting diode) should be on. 2. Motor drives toward open.

Table 12 — High and Low Outdoor-Air Temperature Simulation

TEST PROCEDURE	RESULTS
A. Reconnect factory-installed 800 ohm resistor between terminals S_R and +. B. Connect 1200 ohm checkout resistor between terminals S_O and +. C. Turn set point potentiometer to position A.	Low outdoor-air temperature test results: 1. LED (light-emitting diode) should be on. 2. Motor drives toward open.
D. Turn set point potentiometer to position D. E. Disconnect 1200 ohm checkout resistor.	High outdoor-air temperature test results: 1. LED should be off. 2. Motor drives toward closed.

5. Set the outdoor-air thermostat (OAT) located in the economizer section of the unit (see Fig. 14) to 75 F.
6. If the outdoor temperature is below 75 F, the economizer will control the mixed air with the mixed-air sensor. If the outdoor air is above 75 F, place a jumper around the contacts of the OAT.
7. Jumper terminal T to terminal T1 on the module (see Fig. 15). The economizer will go to the full open position. The outdoor-air damper will go to the full open position, and the return-air damper will go to the full closed position.
8. Adjust mechanical linkage, if necessary, for correct positioning. It may be necessary to remove the filters to adjust the linkage.
9. Remove the jumper from around the contacts of the OAT if installed in Step 6. Remove the jumper from terminals T and T1 installed in Step 7.
10. If the Cooling mode was simulated to operate the unit in Step 4, remove the jumper and reconnect the thermostat wires to terminals Y1 and Y2.

VIII. POWER FAILURE

Dampers have a spring return. In event of power failure, dampers will return to fully closed position until power is restored. *Do not manually operate damper motor.*

IX. REFRIGERANT CHARGE

Amount of refrigerant charge is listed on unit nameplate and in Table 1. Refer to GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures. Unit panels must be in place when unit is operating during charging procedure.

NOTE: Do not use recycled refrigerant as it may contain contaminants.

A. No Charge

Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

B. Low Charge Cooling

Using cooling charging chart (see Fig. 30), add or remove refrigerant until conditions of the chart are met. Note that charging chart is different from those normally used. An accurate pressure gage and temperature-sensing device is required. Charging is accomplished by ensuring the proper amount of liquid sub-cooling. Measure liquid line pressure at the liquid line service valve using pressure gage. Connect temperature sensing device to the liquid line near the liquid ine service valve and insulate it so that outdoor ambient temperature does not affect reading.

C. To Use the Cooling Charging Chart

Use the above temperature and pressure readings, and find the intersection point on the cooling charging chart. If intersection point on chart is above line, add refrigerant. If intersection point on chart is below line, carefully recover some of the charge. Recheck suction pressure as charge is adjusted.

NOTE: Indoor-air CFM must be within normal operating range of unit. All outdoor fans must be operating.

The TXV (thermostatic expansion valve) is set to maintain between 15 and 20 degrees of superheat at the compressors. The valves are factory set and should not require re-adjustment.

X. FILTER DRIER

Replace whenever refrigerant system is exposed to atmosphere.

XI. PROTECTIVE DEVICES

A. Compressor Protection

Overtemperature

Each compressor has an internal protector to protect it against excessively high discharge gas temperatures.

Overcurrent

Each compressor has internal line break motor protection, except circuit no. 1 on the 559F300 unit. Compressor no. 1 on the 559F300 unit uses an electronic module, located with the compressor junction box, to provide motor protection. This electronic module monitors winding and discharge temperatures. If these temperatures reach the trip values, the module interrupts the control line and causes the compressor to switch off.

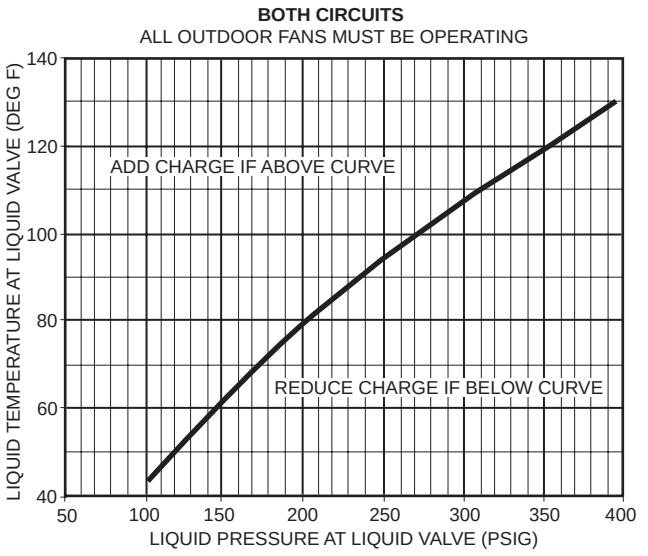


Fig. 30 — Cooling Charging Chart — All Units

Crankcase Heater

Only the 559F300 unit is equipped with a 70-watt crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. The crankcase heater is energized whenever there is a main power to the unit and the compressor is not energized.

IMPORTANT: After prolonged shutdown or servicing, energize the crankcase heaters for 24 hours before starting the compressors.

Compressor Lockout

If any of the safeties (high-pressure, low-pressure, freeze protection thermostat, compressor internal thermostat) trip, or if there is loss of power to the compressors, the CLO (compressor lockout) will lock the compressors off. To reset, manually move the thermostat setting.

B. Evaporator Fan Motor Protection

A manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

C. Condenser-Fan Motor Protection

Each condenser-fan motor is internally protected against overtemperature.

D. High- and Low-Pressure Switches

If either switch trips, or if the compressor overtemperature switch activates, that refrigerant circuit will be automatically locked out by the CLO. To reset, manually move the thermostat setting.

E. Freeze Protection Thermostat

An FPT is located on the top and bottom of the evaporator coil. It detects frost build-up and turns off the compressor, allowing the coil to clear. Once the frost has melted, the compressor can be reenergized by resetting the compressor lockout.

XII. RELIEF DEVICES

All units have relief devices to protect against damage from excessive pressures (e.g., fire). These devices protect the high and low side.

XIII. CONTROL CIRCUIT, 24-V

This control circuit is protected against overcurrent by a 3.2-amp circuit breaker. Breaker can be reset. If it trips, determine cause of trouble before resetting.

XIV. REPLACEMENT PARTS

A complete list of replacement parts may be obtained from any Carrier distributor upon request.

TROUBLESHOOTING

Refer to Table 13 for troubleshooting details.

Table 13 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and condenser fan will not start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor will not start but condenser fan runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective overload.	Determine cause and replace.
	Compressor locked out.	Determine cause for safety trip and reset lockout.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective overload.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive head pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head pressure too low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Restriction in liquid tube.	Remove restriction.
Excessive suction pressure.	High heat load.	Check for source and eliminate.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction pressure too low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
Compressor no. 2 will not run.	Unit in economizer mode.	Proper operation; no remedy necessary.

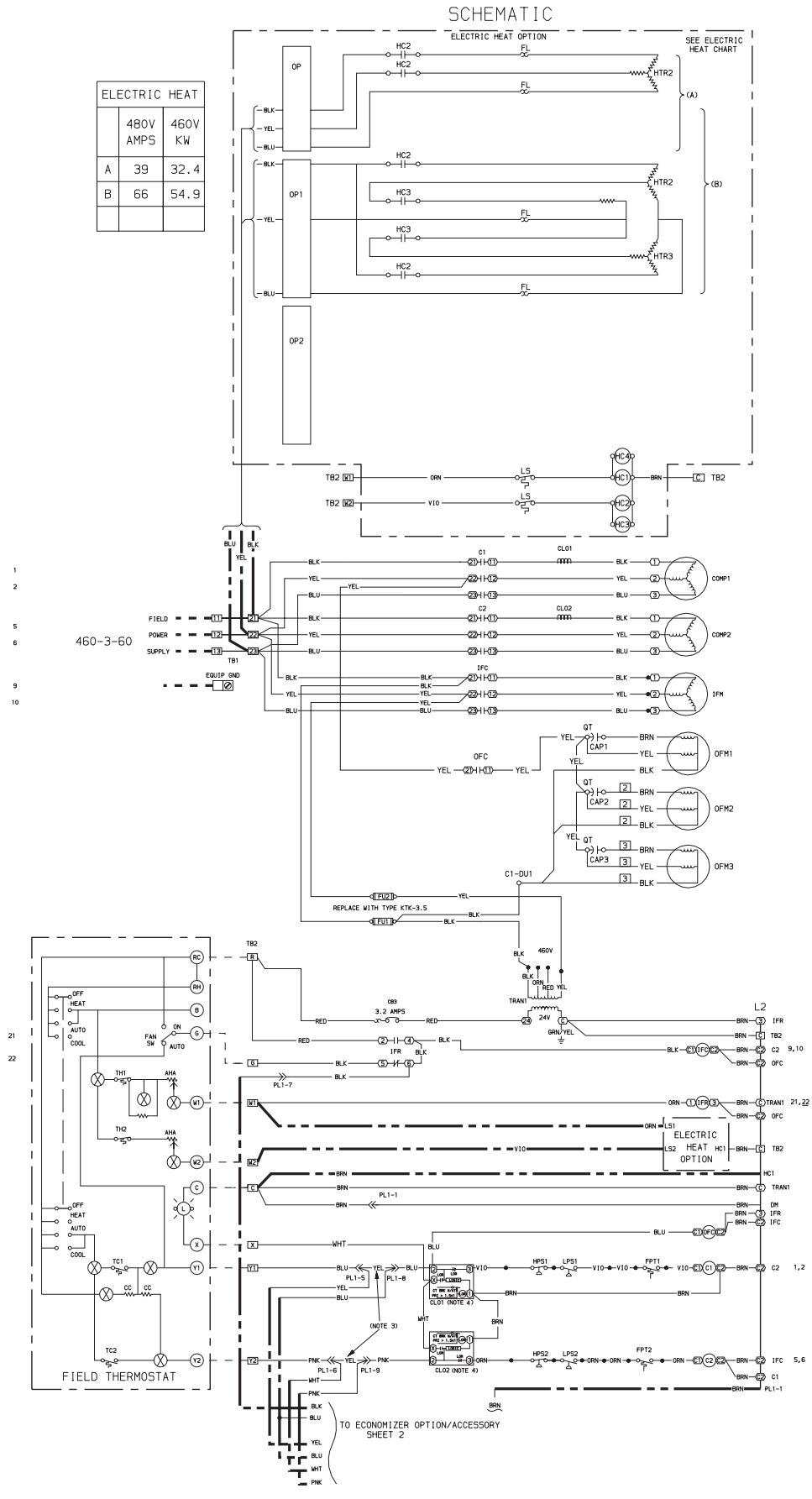


Fig. 31 — Typical Wiring Schematic (559F180, 460-v Shown)

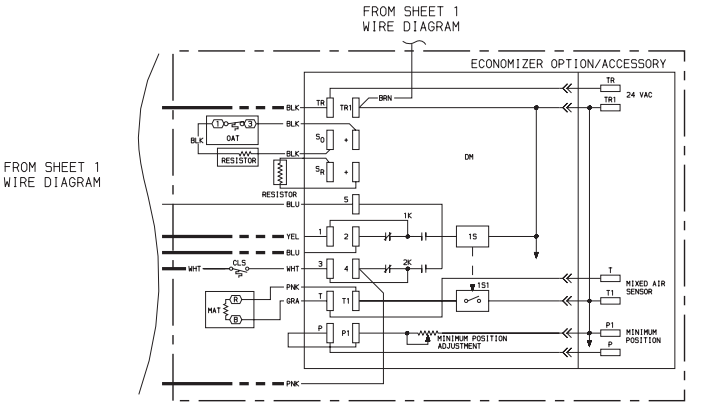


Fig. 31 — Typical Wiring Schematic (559F180, 460-v Shown) (cont)

LEGEND AND NOTES FOR FIG. 31 AND 32

AHA — Adjustable Heat Anticipator
BKR W/AT — Breaks with Amp Turns
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
CLO — Compressor Lockout
CLS — Compressor Lockout Switch
COMP — Compressor Motor
CT — Current Transformer
DM — Damper Motor
DU — Dummy Terminal
EQUIP — Equipment
FL — Fuse Link
FPT — Freeze Protection Thermostat
FU — Fuse
GND — Ground
HC — Heater Contactor
HPS — High-Pressure Switch
HTR — Heater
IFC — Indoor-Fan Contactor
IFCB — Indoor-Fan Circuit Breaker
IFM — Indoor-Fan Motor
IFR — Indoor-Fan Relay
L — Light
LOR — Lockout Relay
LPS — Low-Pressure Switch
LS — Limit Switch
MAT — Mixed-Air Thermostat
OAT — Outdoor-Air Thermostat
OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
OP — Overcurrent Protector
PL — Plug Assembly
PRI — Primary
QT — Quadruple Terminal
SR — Solenoid Relay
SW — Switch
TB — Terminal Block
TC — Thermostat Cooling
TH — Thermostat Heating
TRAN — Transformer
Terminal (Marked)
Terminal (Unmarked)
Terminal Block
Splice
Factory Wiring
Field Wiring
To Indicate Common Potential Only, Not To Represent Wiring
Option/Accessory Wiring

NOTES:
1. Compressor and fan motors thermally protected; 3-phase motors protected against primary single-phasing conditions.
2. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
3. Jumpers are omitted when unit is equipped with economizer.
4. The CLO locks out the compressor to prevent short cycling on compressor overload and safety devices. Before replacing CLO, check these devices.
5. Number(s) indicates the line location of used contacts. A bracket over (2) numbers signifies a single-pole, double-throw contact. An underlined number signifies a normally-closed contact. A plain (no line) number signifies a normally-open contact.

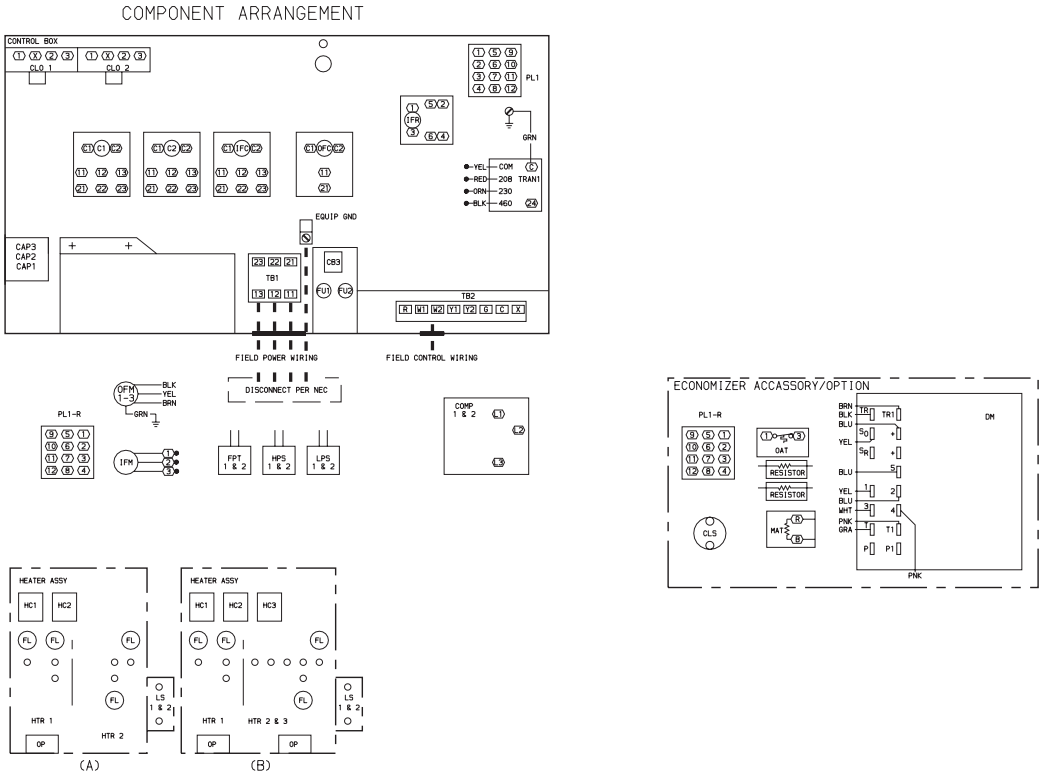


Fig. 32 — Typical Component Arrangement (559F180 Shown)

Packaged Service Training programs are an excellent way to increase your knowledge of the equipment discussed in this manual, including:

- Unit Familiarization
- Installation Overview
- Maintenance
- Operating Sequence

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START-UP CHECKLIST

MODEL NO.: _____ SERIAL NO.: _____

DATE: _____ TECHNICIAN: _____

I. PRE-START-UP:

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY INSTALLATION OF INDOOR FAN MOTOR ADJUSTMENT BOLT (180 UNITS) OR ADJUSTMENT BOLT AND PLATE (216-300 UNITS)
- ☐ OPEN ALL SERVICE VALVES (SUCTION, DISCHARGE, AND LIQUID)
- ☐ VERIFY INSTALLATION OF ECONOMIZER HOOD
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ CHECK THAT INDOOR-AIR FILTER IS CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SET SCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SCROLL COMPRESSOR IS ROTATING IN THE CORRECT DIRECTION

II. START-UP:

ELECTRICAL

SUPPLY VOLTAGE L1-L2 _____ L2-L3 _____ L3-L1 _____

COMPRESSOR AMPS — COMPRESSOR NO. 1 L1 _____ L2 _____ L3 _____

— COMPRESSOR NO. 2 L1 _____ L2 _____ L3 _____

SUPPLY FAN AMPS _____ EXHAUST FAN AMPS _____

ELECTRIC HEAT AMPS (IF SO EQUIPPED) L1 _____ L2 _____ L3 _____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE _____ F DB (Dry-Bulb)

RETURN-AIR TEMPERATURE _____ F DB _____ F WB (Wet-Bulb)

COOLING SUPPLY AIR _____ F

ELECTRIC HEAT SUPPLY AIR (IF SO EQUIPPED) _____ F

PRESSURES

REFRIGERANT SUCTION CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 (216-300 ONLY) _____ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 1 _____ PSIG CIRCUIT NO. 2 (216-300 ONLY) _____ PSIG

☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHART ON PAGE 24

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS
- ☐ VERIFY INSTALLATION OF ALL OPTIONS AND ACCESSORIES

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE